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Defense Planning for the Post–Cold War Era

Giving Meaning to Flexibility, Adaptiveness, and Robustness of Capability

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Prepared for the Joint Staff

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National Defense Research Institute

PREFACE

This study was prepared for the Joint Staff's Director of Strategic Plans and Policy (DJ-5). It is intended primarily for mid- and high-level civilian and military readers in the Department of Defense and military commands, other defense-planning analysts, and midcareer officers in war colleges. It should also be of interest to scholars interested in defense planning and how it is changing. The work was conducted in the International Security and Defense Strategy program of RAND's National Defense Research Institute (NDRI), a federally funded research and development center (FFRDC) sponsored by the Office of the Secretary of Defense and the Joint Staff.[1] Research was completed in January 1993.

[1]This report also benefited from related work conducted with research-support funds provided by RAND's three national-security FFRDCs: NDRI, Project AIR FORCE, and the Army-sponsored Arroyo Center.

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OBJECTIVES

The objectives of this study are (a) to describe a new vision of operationally oriented defense planning, (b) to introduce related concepts for planning under uncertainty, and (c) to recommend a strategy for implementing and refining the ideas over time.

The study seeks to communicate and extend significantly ideas about operations planning that have recently been embraced by the Chairman of the Joint Chiefs of Staff and translated into requirements for the military commands. The study also proposes new analytic methods and recommends a rather fundamental restructuring of defense planning generally (i.e., of strategic and programmatic planning, as well as operations planning).

MOTIVATIONS

Conventional wisdom has it that Cold War defense planning was well developed and sophisticated, but that changes are now necessary to deal with diverse and vaguely defined threats rather than a monolithic and well-defined Soviet threat. The reality is that there were serious deficiencies even in Cold War defense planning. The long and relatively stable Cold War confrontation had led, in some respects, to an ossification of defense planning. Much of the alleged sophistication might better have been described with adjectives such as rigid, unrealistic, monolithic, and stereotyped. This was true despite the expressed desire of successive secretaries of defense for flexibility.

Consider, for example, the enormous emphasis placed on developing a single operations plan for the defense of Western Europe. This plan and the corresponding scenario used for programmatic work depended on dozens of crucial assumptions, but both were often treated as though they were reliably predictive, despite everyone's knowing better. Although military leaders surely thought about wartime adaptations, they were unable to develop them in detail, much less exercise them. As a second example, consider the recent Gulf crisis. Prior planning assumed: considerable actionable warning; a series of partial alerts, mobilizations, and deployments; and a particular sense of what was and was not to be defended. Not surprisingly, the assumptions were wrong. Had Saddam Hussein continued into Saudi Arabia without delay, the U.S. would have had an extremely difficult time countering the invasion—not only because of the distances involved and political constraints, but also because we were ill-prepared for *rapid*, highly adaptive, *large*-scale operations. There had been inadequate discussions with political leaders about alternative military strategies, there were few preliminary measures taken in response to strategic warning, the military planning system was too slow in adapting, there were major misunderstandings about what could realistically be done by a deploying CINC and his staff, the on-the-shelf plan was sketchy, and adaptations made by the CINC could not be accommodated gracefully by the command and control system.

With the end of the Cold War and the recent experience with Saddam Hussein's Iraq (in which the U.S. began deployments four days *after* D-day), it is no longer necessary to convince people that real wars tend not to follow anticipated timelines and anticipated political paths. It is now well accepted that we should think in terms of flexibility, adaptability, and robustness of capability. Further, there is a recognized premium on planning for *deterrence* (and compellence) of Third World opponents, not just for clear-cut warfighting. This was well appreciated as of early 1990 by the Joint Staff, which has led in bringing about a host of recent changes. Much is yet to be accomplished, however. Consider first operations planning.

The operations-planning process needs not only to be flexible for reacting to the unanticipated, but to be capable of *speed* under crisis pressure. This is especially true when the purpose is to deter or stop conflict (rather than to win a war), because to be effective such

actions must often be prompt and show unequivocal resolve. Military planners must therefore be able quickly to develop and present a range of politically and strategically appropriate options. Then, given decisions, they must be able to execute the strategy quickly and adaptively. The importance of making deterrence work is greater than ever, because some future opponents will probably have tactical ballistic missiles with nuclear, chemical, or biological weapons. Given a *fait accompli* by such an opponent, it might be very difficult politically and militarily for the U.S. to insert forces and conduct a counteroffensive comparable to the one it carried out in the Persian Gulf in 1991.

Despite the substantial recent changes in U.S. military planning, the current system seems to us unlikely to meet the challenge posed above. The basic problem is that much of the system is still structured around so-called "Deliberate Planning," which has until recently been the virtual antithesis of what we seek. Until recent reforms introduced by the Joint Staff, CINCs typically focused the vast bulk of their planning effort on standard scenarios. The Joint Staff's new guidance requires the CINCs to consider multiple scenarios and to develop plans with built-in flexibility. The new process is sometimes compared with football, in which teams develop playbooks with options triggered by "audibles" before the snap, or by choices of the quarterback or running back (as in triple options).

Despite these considerable gains and the quality of the new guidance, we believe remaining difficulties are likely to seriously undercut capability for *rapid* highly adaptive planning in large and complex contingencies. The deliberate planning system includes many critical functions that must be retained (e.g., developing procedures, data bases, and planning factors), but even the improved version of deliberate planning is a poor vehicle for practice, experimentation, and learning. In particular, deliberate planning:

- Produces a few detailed plans (albeit with significant flexibility within those plans) rather than refining an adaptive planning *process* able to deal quickly with challenges not foreseen in the preplanned options.
- Has no routinized *testing* of plans for nonstandard situations. (To recall the football metaphor, it is as though the team spent all

its time building playbooks and options, without the benefit of stressful practice and games to test, refine, and broaden the options.)

- Has no success standards relating directly to crisis planning (e.g., rapid adaptiveness and flexibility for the President).
- Does not include many of the participants that would be most significant in crisis and does not go far enough in laying the framework for coordinating political, economic, and military instruments (which coordination would be an NSC function).
- Relies on communications, obsolete data-processing systems, expertise, and other supporting tools that are inappropriate for crisis operations.
- Discourages planners from dealing often enough and well with scenario variants that are decidedly nonstandard.

To elaborate on this last item, we have in mind the importance of thinking through scenarios currently deemed improbable (until they happen) or "unacceptable" (e.g., scenarios presupposing a type of U.S. military involvement currently believed to be undesirable). Ideally, planners should routinely be working through nonstandard scenarios that are objectively plausible and important, whether or not pleasant to contemplate. For example, it is entirely appropriate that the DoD study in detail possible strategies for deterring a future Russian reinvasion of Lithuania, including strategies focused on deterrence through threat of punishment rather than through capability to defeat an invasion. Similarly, the DoD should be constantly studying—*long before they become salient*—potential strategies for contingencies as unpopular as limited military intervention in the former Yugoslavia under various coalitional arrangements and with various distinctly limited objectives. (It should be doing this while simultaneously emphasizing, at every opportunity, the importance of establishing clear objectives and developing political consensus before committing the U.S. to war).

With this background, let us describe the approach we suggest. Key elements include: (a) reconceptualizing planning to more seriously confront the issue of uncertainty, building heavily on the recent Joint Staff initiatives; (b) building-block planning for rapid plan develop-

ment and adaptation; (c) revising organizational relationships to better integrate work on strategy, programs, and current operational planning; and (d) constant exercising of the system's capabilities.

PLANNING UNDER UNCERTAINTY: A NEW WAY TO CONCEPTUALIZE THE PROBLEM

The preeminent challenge of U.S. defense planning is dealing with uncertainty. It is this challenge that leads to requests for flexibility, adaptiveness, robustness, and nimbleness. There are literally hundreds of critical factors that determine what constitutes an appropriate military strategy in time of crisis or conflict. How does one take all of these into account in planning? And how is this different in the cases of strategic, programmatic, and operations planning?

We believe the first step should be to reject categorically, once and forever, the longstanding approach of focusing on one or a few standard scenarios. Lest there be misunderstanding here, planning would still use scenarios, and there would still exist analytical baseline cases, which are essential for guidance and analysis (e.g., in providing common yardsticks), but the baseline cases would no longer be the centerpiece of planning (and would include cases very different from current planning scenarios). So long as standard scenarios are the centerpiece, and despite protestations to the contrary, many peacetime planners will come to treat them as predictive, as though they believe them, and will develop mental attitudes, analytical constructs, and procedures making *rapid* adaptation in large-scale crisis difficult. Empirically, we know that calling the scenarios "illustrative" has never solved this problem, because organizations yearn for concreteness and the "test cases" become "the" cases.

The next step is to conceptualize the planning problem as one of dealing with a large "space" of plausible scenarios. Importantly, we do not merely mean having one scenario for each of many geographical regions. Instead, each currently standard scenario for a given geographical region (e.g., North Korea's invasion of South Korea) should be considered to be merely one point in a large space of possible scenarios. This "scenario space" can be thought of as having six aggregate dimensions, with a single scenario being a point in that many-dimensional space. The dimensions are as follows:

1. *Political-military setting* (e.g., alliances, origin of crisis, broad interests, and timing).
2. *Operational objectives and strategies* (for the U.S., opponents, allies, and third countries).
3. *Forces and other instruments of power.*
4. *Weapon-system and individual-force capabilities* (e.g., accuracy of precision munitions, the movement rate of armored units, efficiency of command-control systems, and the qualitative effectiveness of officers and men resulting from training, morale, and other factors).
5. *Geographic and other aspects of environment* (e.g., weather, terrain, transportation networks, and port facilities).
6. *The processes that govern military operations, including combat* (e.g., the equations describing the phenomena of combat and movement).

The U.S. cannot and should not seek to have military capabilities sufficient to ensure success for the full space of plausible scenarios. However, defense planners should know "the envelope," i.e., know what portions of scenario space the U.S. could now and should in the future be able to deal with effectively.

Further, planners should understand that the space is a continuum: e.g., it may prove possible to react weeks before a crisis breaks or war begins, or to find ourselves reacting *afterward*, as happened in the Persian Gulf. The "best estimate" warning time is often no more likely than a very different number. Nor is it adequate, despite years of arguments to the contrary, to base planning on "worst-case scenarios," or on "worse-than-expected scenarios." An operations plan adequate for a very stressing scenario may be quite inadequate for scenarios that "should be" less stressing, but that require different strategies and special-purpose capabilities. For example, having robust capability to defeat a future reinvasion of Kuwait by a ten-division Iraqi army providing only 10 days warning (a very stressful case) might be quite inadequate to deal with an invasion that started with an internal revolution in Saudi Arabia, a partial collapse of the government, and the "invited" entrance of the Iraqi army for "peacekeeping" by the revolutionary faction.

This concept of scenario space and the coverage envelope of a particular U.S. force may be useful to defense planning in several ways:

- *By focusing defense programs away from standard scenarios toward improving the size and shape of the desired "envelope of capabilities."* Figure S.1 illustrates this for a class of scenarios described by the items at the top right (war with Iraq, revisited). Within this context, the x and y axes represent two of the most important scenario variables, the time available before D-day and the size of the enemy threat. The diagram then expresses notional requirements as follows: we want the capability to deal with all the scenarios in the light region inside the "envelope boundary for assured success." We also want the capability to deal successfully—given favorable circumstances with respect to other scenario variables (e.g., weather and allied cooperation)—with all the scenarios in the region with slashes. By contrast, we do not seek the capability to deal successfully with the scenarios in the dark region, except perhaps in instances in which all other factors are highly favorable. Note that requirements are expressed in terms of a region in scenario space, not a particular point scenario.
- Figure S.2 is a discretized representation of similar notional requirements, but with some additional nuances treated. Here again, "light" means that the requirement is for success without demanding much luck; slashes mean that the requirement is for success in instances in which circumstances are favorable; and dark shading indicates cases that are too hard (or too expensive) to deal with rapidly. We would need to consider them also, but with different kinds of strategies such as a lengthy campaign to reenter the region.

The scenario-space concepts can also be useful in other ways:

- *By clarifying the roles and relationships of different types of defense planning.* Strategic planning should identify the envelope to be covered. Program planning should find ways to develop the requisite capabilities. Operations planning should assure that the full resources available to the nation can be effectively employed within the currently relevant envelope.

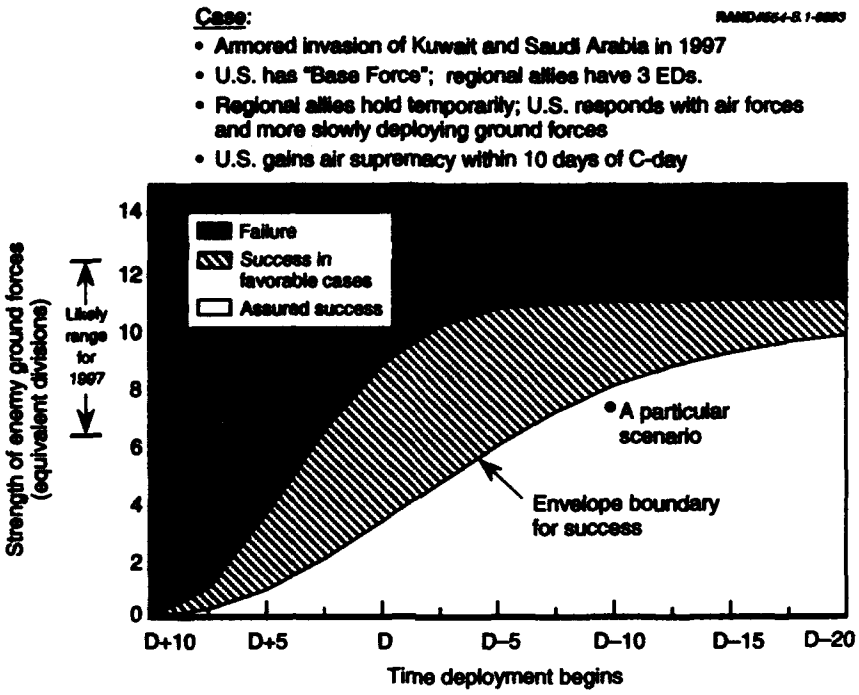

Figure S.1—Notional Capability Envelope in Portion of Scenario Space

- ***By avoiding the hodgepodge of most-favorable-case, worst-case, and best-estimate-case assumptions that populate standard planning scenarios, which are often treated as though they were meaningful "best estimates."*** In the scenario-space approach one refuses to identify the "right" degree of optimism or pessimism, but rather characterizes the circumstances under which capabilities appear adequate, inadequate, or marginal. If capabilities are marginal, intervention may be feasible only when details of context are unusually favorable (i.e., only in lucky cases).
- ***Closing the gap between capabilities-based planning and threat-based ("requirements-based") planning, which has recently been controversial between the DoD and portions of the Congress.*** In the scenario-space approach, specific threat scenarios are merely particular points within the interesting region of scenario space. They are mere examples and do not define "requirements."

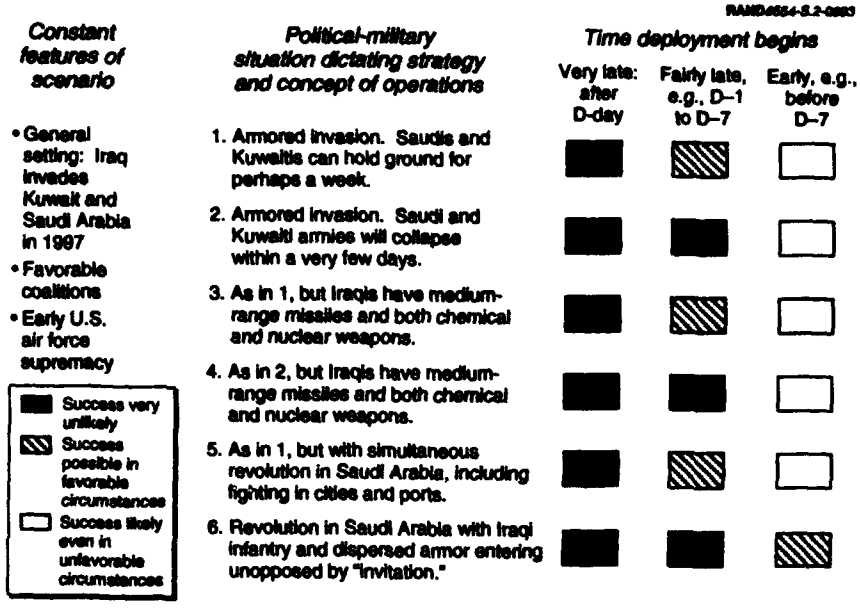

Figure S.2—An Illustrative Scenario-Space Requirement Display

- *By alleviating the political and diplomatic constraints on defense planning.* The significance of individual scenarios will recede, and it will be easier to explain leaks about controversial scenarios by saying, with more truth than today, that "We look at them all, without prejudice."

NEW OPERATIONS PLANNING: AT-THE-TIME PLAN DEVELOPMENT USING BUILDING-BLOCK METHODS

To military officers experienced in crisis action, the approach needed for planning military operations under the enormous uncertainty of a large scenario space is fairly obvious: refine the skills and processes needed to create plans at the time of the crisis or conflict, without pretending to be able to anticipate the details in advance. Doing so involves thinking through many versions of a class of crises, identifying actions that could be taken and forces that could be used, and thinking of them as "building blocks" to be assembled appro-

priately when the time comes. This is indeed what good officers do already when they can; it is quite natural to professional American officers, who are quite adaptive. The deliberate planning system, however, is poorly structured to exploit these talents and attitudes, even with the new changes, and the crisis action system is not designed for large-scale operations. As a result, the U.S. today would have great difficulty adapting quickly to a subtle, complex, and fast-breaking *major* regional contingency.

Key to achieving this type of adaptive-planning capability is a great deal of practice, experimentation, and learning. This would include wargaming and exercises, no-notice testing to produce realistic and executable plans, and participation of civil leaders who would formulate policy in a crisis—often making decisions that military leaders might not like, because of a variety of political constraints, and because of different strategic judgments. The criterion for success would not be the richness or efficiency of plans for dealing with standard scenarios well known in advance, but rather the ability to quickly produce viable plans covering the range of political-military objectives that a President might want to consider.

Our vision, then, recommends a new approach to operations planning (Figure S.3) that would deal with organization, methods, training and exercising, and decision-support tools. It would:

- Eliminate the deliberate-planning system (although retaining many of its functions, which are critical in laying the groundwork for any kind of operation) and greatly extend the crisis-action-planning system.
- Develop in moderate detail, for each of a number of geographical regions, multiple "analytic baseline" plans for points in scenario space representative of different "classes" of scenario, with each class being characterized by a different concept of operations.[1]

[1]Some of these baselines would be analogous to current defense-planning scenarios, but others would be substantially different, even controversial. For example, while a standard current scenario might envision a replay of Saddam Hussein's invasion, with some actionable warning time and a stronger contingent of Kuwaiti and Saudi forces to delay it, the new system would include alternative baselines in which, for example, Iraq's forces achieve breakthroughs immediately and U.S. forces have to fight their way into the region. This would require a very different concept of operations.

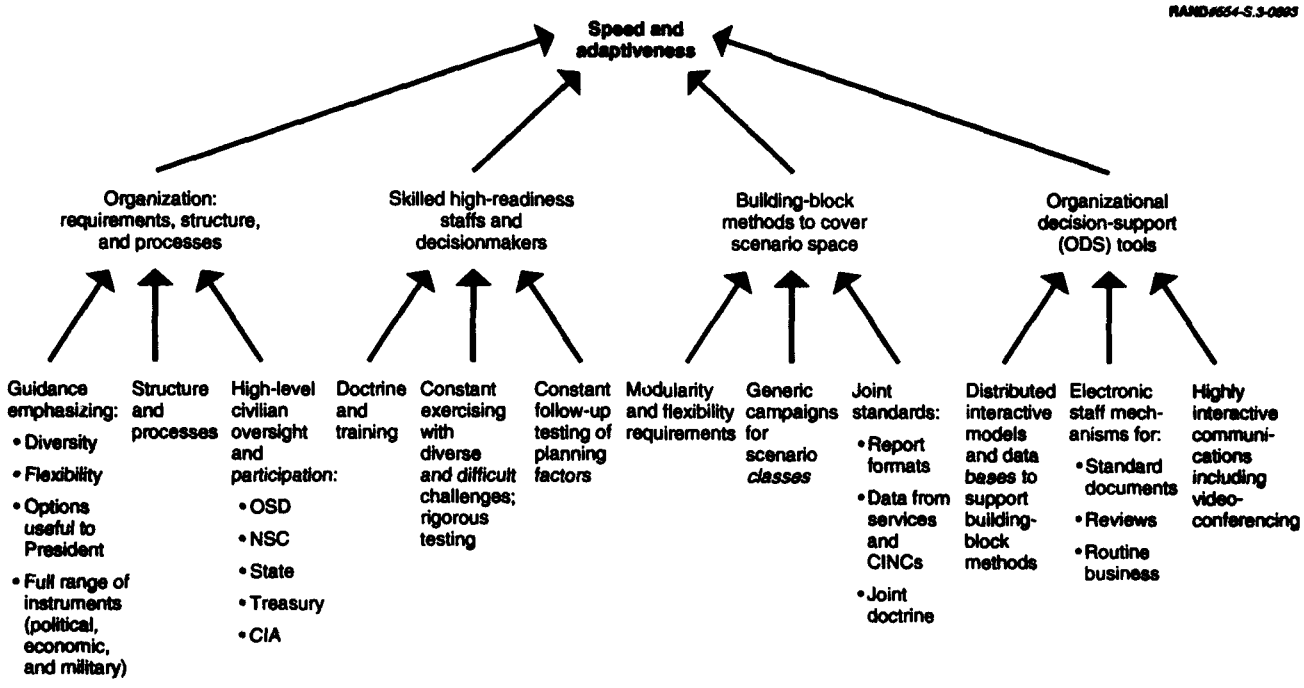

Figure S.3—Components of an Overall Approach to Operations Planning

- Allocate levels of effort so that analytic baseline plans are only starting points, with most effort being directed toward exercising rapid-planning capabilities for variants from the baselines. Criteria for exercise success would be executability of plans, political-military appropriateness of the options, and robustness of plans with respect to plausible opponent actions and "random" events.
- As part of the testing of the rapid-planning system, evaluate and refine building-block operations and force modules, as well as ways to compensate when building blocks don't quite work.
- Exploit new decision-support technologies for planning and for planning, conducting, and evaluating exercises, including distributed interactive simulation and distributed wargaming.

NEW DEFENSE PLANNING RELATIONSHIPS: INTEGRATING STRATEGIC, PROGRAMMATIC, AND OPERATIONAL PLANNING

So far, we have focused mostly on operations planning, but the study also sought ways in which the *methods* of strategic, programmatic, and operations planning could be better integrated (without losing track of the distinctions among them, which stem from their different purposes and time scales). Figure S.4 summarizes our approach. It starts (left branch) by recognizing a need for national-level planning guidance to assure integration of political, economic, and military instruments of contingency operations. DoD would take the lead in staffing and developing the appropriate interagency operations, but the NSC would guide the effort. A second key element is establishing a common intellectual framework, which we believe needs to reflect an "operational perspective." That is, all types of planners should have the objective of producing effective capabilities for real-world operations in crisis, which means that thinking in terms of capabilities for successful military campaigns should be central. With this in mind, our third component involves methods of analysis focused on scenario-space concepts, generic campaigns and generic concepts of operations, and multiscenario analysis exploiting modern simulation technology over many thousands of cases, not handfuls. The emphasis in programmatic planning should be on *capabilities analysis and marginal analysis*, since there are enormous

uncertainties about effective threat levels and scenario details, and we cannot afford to buy unlimited insurance. The fourth component of our approach is to assure that the various types of planners have shared experiences by rotating across boundaries in their assignments, by participating in wargames and other exercises, and by having some common professional outlets.

Finally (rightmost branch of Figure S.4), we propose a series of formal feedbacks and interconnections:

- Strategic planners (NSC, OSD, CJCS, State) would formulate broad guidance about desired current and future capabilities using scenario-space concepts. Guidance would specify key *regions* in scenario space and suggest policy-relevant criteria for testing capabilities (e.g., conditions for the use of force, war termination objectives, acceptable costs in casualties and fiscal resources, timeliness of planning response, and the range of options available to the President).
- Operations planners, when not doing field duty, would rotate between two kinds of assignment: (a) near-term operations planning, and (b) similar work conducted in support of mid- and longer-term studies related to strategies and programs. They would use closely similar methods and tools. Results would be fed back to strategic planners and program analysts to give insights about what was feasible with different degrees of risk and dependence on special circumstances, and what capabilities appeared to be most and least important.
- Program planners would conduct additional analyses and would then formulate and assess programmatic options. Initial option assessment and narrowing would be conducted by the program planners themselves. Their products might again be fed to operational planners for evaluation.
- For this process to work effectively, it would probably require neutral oversight. Given that power relationships among participating institutions could be strongly affected, there would seem to be inherent pressures on this process to bias testing and reporting to serve institutional interests. Therefore, creation of a "Readiness Inspector" reporting to the Secretary of Defense and Chairman should be considered.

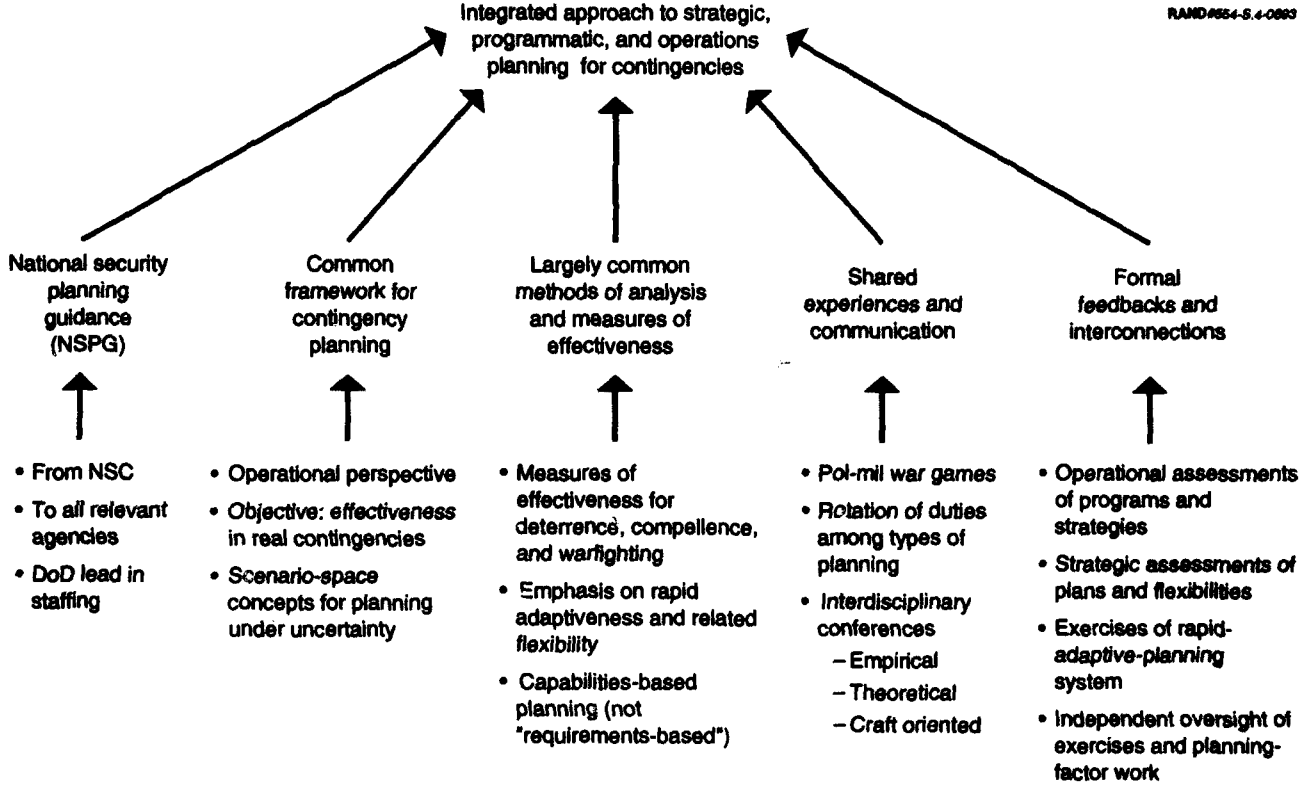

Figure S.4—Components of an Approach to Integrating Defense Planning

- Finally, the product of this process (including uncertainty analysis), might, after suitably removing diplomatically sensitive material, be used before Congress as the evidentiary basis for the President's budget and programs. Conceivably, a very few senior congressional representatives might also usefully participate in parts of the testing process itself, given the substantial role Congress plays in determining the circumstances under which military force would be used.

ORGANIZATIONAL CHANGES FOR IMPROVED DEFENSE PLANNING

Many changes will be needed if the vision we describe is accepted. With the exception of the new Readiness Inspector post for defense planning, no existing institutions would be created or eliminated, but changes in what planning organizations do and how they do it would require bold initiatives. Most importantly (consistent with Figure S.4), we recommend the following.

The NSC and its staff should:

- Formulate and coordinate the requisite interagency studies, implementing directives, and legislative requests.
- Provide strategic policy guidance.
- Actively participate in exercises to test operational planning.

The Secretary of Defense and his staff should:

- Amend the Planning, Programming, and Budgeting System (PPBS) to make it responsive to the objectives of the approach. This would include changing standard measures of effectiveness used in reviewing defense-program options and educating OSD officials with respect to the kinds of challenges faced by operations planners.
- Direct appropriate high-level participation in crisis planning exercises and tests of the crisis-planning system.
- Assure that the operational planning system is able to produce executable plans with options appropriate for presentation to the President.

- With the Chairman, use a newly created Readiness Inspector for defense planning to provide an independent assessment of the testing methods and results.

The CJCS/Joint Staff should:

- Develop a permanent staff of war planners to work with CINC staffs in honing the skills and processes needed for the new system. The Joint Staff participants should think of themselves as "strategic assemblers" rather than as mere coordinators.
- Put into place the technology to facilitate close teamwork between the Joint Staff and CINC staffs. This would include extensive model-supported videoconferencing—for staffs, not just for commanders.
- Develop highly interactive and user-friendly computer models and data bases for effective building-block planning. This decision support system would be very different in nature from the JOPES system, which reflects the "data-processing mentality" of an earlier generation of technology and a different part of the technical community than that responsible, e.g., for the successful DART interface.
- Institute a program of command-post exercises to assure effectiveness in rapid planning. Such a program would include no-notice test exercises with only rudimentary prior knowledge of the crisis to be focused upon, and with realistically complex changes of political-military ground rules occurring in the course of the exercise. Follow-up studies should determine the degree to which plans developed in the exercises could, in fact, have been executed.
- Become an active but cautious and analytically critical early user of both distributed interactive simulation (DIS) and associated wargaming on the one hand, and highly interactive analytic wargaming models on the other.
- Develop information requirements to assist rapid adaptive planning (e.g., requirements for services and CINCs to define a wide variety of standard support packages for ground, air, and naval units operating in different circumstances of terrain, potential opposition, mission, and time criticality).

The War Colleges should, even if it means sacrificing other courses:

- Revise curricula to introduce basic concepts of planning under uncertainty and adaptive planning, and provide officers with personalized computer tools to experiment with adaptive planning (e.g., microcomputer wargames with intelligent opponents and allies, and with random factors affecting decisions and operations).
- Devote more curriculum attention to realistic assessment of opponent capabilities and opponent reasoning, with an eye toward refining officer capability to understand tradeoffs between the virtues of timely actions for deterrence and delayed actions with more substantial forces.

IMPLEMENTATION: MANAGING NEW POWER RELATIONSHIPS

Implementing our vision would cause major shifts in the power relationships among planning institutions. We hope that our case for this approach is so compelling that the institutions will embrace it. It is more likely, however, that there will be initial resistance because of predictable concerns about organizational "losses." At the same time, organizations would "win" some new authority and influence. Some examples of this are:

- Military operational planners would be required to deal seriously with a much broader range of scenarios than they have previously, including scenarios that they would ordinarily resist even contemplating. Their methods would also become more widely known, although not sensitive current-day assumptions. On the other hand, they would have increased influence on strategy and programs.
- CINCs would be more explicitly tied into a national-level system with heavy participation not only by the Joint Staff, but also by some key civilian officials from OSD, NSC, State, Treasury, and elsewhere. The CINCs would, however, gain influence in strategic and programmatic planning.

- Program planners would lose some of their control over formulating and evaluating programs. But they would gain by having an independent and more compelling evidentiary base for supporting their programs provided by the exercises of the operational planners. Further, they would have the gratification of knowing how their efforts will lead to capabilities that will in fact be used.
- Strategic planners would take on more burdens in linking their plans to operational and programmatic planning, and subjecting their ideas to the scrutiny of operational testing. But in return, strategic planning would be more effective in channeling programmatic efforts and operations planning.

Thus, beyond substantive merit, there may be a basis for a grand bargain among the planners. Again, however, this may be insufficient to overcome institutional roadblocks. In this case, the vision need not be implemented in its totality or all at once to make improvements over the current approach. Many of the recommendations could be implemented under the authority of the Chairman.

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We gratefully acknowledge the contributions of RAND consultant Paul Bracken on issues of organizational change. We also appreciate discussions with and a detailed review by Col Clifford Krieger (USAF) of the National War College, Col Dail Turner (USAF, retired, previously of the Joint Staff's J-5), COL Harry Rothmann (U.S. Army), and other officers on the Joint Staff or on the staffs at USCENTCOM, USPACOM, and USTRANSCOM. Finally, we appreciate the formal reviews provided by RAND colleagues James Winnefeld and Michael Hix.

ACRONYMS

C-day	Day on which deployments begin
CG	Chairman's Guidance
CINC	Commander in Chief of a specified or unified command
CJCS	Chairman, Joint Chiefs of Staff
CNASP	Chairman's Net Assessment for Strategic Planning
CONPLAN	Concept Plan
CPA	Chairman's Program Assessment
CPAR	Chairman's Preparedness Assessment Report
D-day	The day combat begins
DPG	Defense Planning Guidance
DPRB	Defense Policy Resources Board
FDLs	Fast Deployment Logistics Ships
FDO	Flexible Deterrent Option
JMNA	Joint Military Net Assessment
JPD	Joint Planning Document
JSCP	Joint Strategic Capabilities Plan
JSOG	Joint Staff Officers Guide (DoD, 1991), usually known as "the Purple Book"
JSPS	Joint Strategic Planning System

JSR	Joint Strategy Review
LRC	Lesser Regional Contingency
M-Day	Full mobilization begins
MPS	Maritime Prepositioning Squadron
MRC	Major Regional Contingency
OPLAN	A detailed Operations Plan
POM	Program Objective Memorandum
PPBS	Planning, Programming, and Budgeting System
TPFDL	Time-Phased Force and Deployment List
UCP	Unified Command Plan

Chapter One

INTRODUCTION

OBJECTIVES

The objectives of this report are: (a) to describe a new vision of defense planning suitable for the post–Cold War era; (b) to develop a related framework concept for planning under uncertainty; and (c) to recommend an implementation strategy to introduce and refine the new methods over time.

Much of the report seeks to communicate and extend significantly ideas that have recently been embraced by the Chairman of the Joint Chiefs of Staff and translated into requirements for the military commands. In addition, the report proposes new analytic methods consistent with the new demands and recommends a rather fundamental restructuring of the way in which the Department of Defense approaches defense planning generally.

BACKGROUND

Origins of the Project

The motivation for this work was a request in mid-1990 by the Joint Staff's DJ-5, the Director for Strategy and Plans, who sought from RAND a study that would help define and communicate a new approach to defense planning[1] emphasizing adaptiveness and realism

[1]Our treatment of defense planning focuses primarily on strategic, programmatic, and operations planning related to preparing for *major* contingencies. We do not examine mobilization or reconstitution, personnel management, research and development,

in anticipating and dealing with "nonstandard" contingencies (i.e., contingencies unfolding in ways very different from the canonical scenarios for invasion of Western Europe by the Warsaw Pact).[2] Part of the project was to deal with the difficult challenge of understanding opponent reasoning in crisis and conflict, and developing strategies to affect that reasoning. A key element in the project was the need for the DoD to be able in crisis to present the President with a *range* of appropriate options.

Seminal Events and Changes Instigated by the Joint Staff

Before work on the project had actually begun, Iraq invaded Kuwait and the world saw an example of the very kind of allegedly "nonstandard" contingency that the DJ-5 and Chairman had in mind. It then proved possible for the Joint Staff (and OSD) to move faster in introducing some of its new ideas for military strategy and defense planning than otherwise would have been possible. Even initial deployments in Desert Shield were conceived and directed in the emerging framework, which includes "flexible deterrent options" (FDOs) as well as warfighting options.[3] Indeed, in the last two years the Joint Staff has begun to change *fundamentally* the way in which military planning is conducted, emphasizing being prepared for a sizable number of scenarios with many unpredictable features, and being able to respond effectively with diverse instruments.[4]

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lesser regional contingencies, or a host of other issues that are part of defense planning in the large.

[2]The request to RAND by the Director, J-5 or DJ-5 (General George L. Butler, subsequently Commander in Chief of the U.S. Strategic Command) was due to prior work at RAND on methods for strategic planning under uncertainty and military planning for nonstandard contingencies (Davis, 1988a, 1989a; and Winnefeld and Shlapak, 1990).

[3]The initial deployments in Desert Shield had the proximate objective of deterring moves by Saddam Hussein against Saudi Arabia or arriving U.S. forces. It was also hoped (with little expectation of success) that this deployment would encourage him to immediately withdraw peacefully from Kuwait. Thus, the U.S. deployment was attempting both deterrence and compellence. At the same time, it was placing in motion a massive process that would culminate in a warfighting capability to defend Saudi Arabia and then dislodge Saddam's forces from Kuwait. See Department of Defense (1992).

[4]One of the more interesting and difficult challenges in the study has been to stay ahead of the changes, since the Joint Staff was implementing them at an unprecedented pace.

Project History

RAND's initial emphasis in the project was on understanding in some detail how to develop *alternative models* of opponent reasoning and then build hedged strategies for effective deterrence or coercion. The result was a generic theory (Davis and Arquilla, 1991a), which was then applied—after the invasion but during the crisis—to Saddam Hussein (Davis and Arquilla, 1991b). The theory was tested further (Arquilla and Davis, 1992) against historical incidents earlier in the century, notably the Colombian move against Panama (1903), Mussolini's invasion of Ethiopia (1935), North Korea's invasion of the South (1950), and the Red Chinese threat to Quemoy and Matsu (1958).

Other early work in the project dealt with better integrating political, military, and economic instruments in developing deterrent options (something now embraced by the Joint Staff and reflected in instructions to CINCs) and a review of how the end of the Cold War required changing many of the analytic paradigms that guided defense planning (discussed more fully in Chapter Two). The remainder of the project was concerned with how, in the post–Cold War era, to improve planning for major contingencies and how to better coordinate, even integrate, the development of national security strategy, operations planning, and program development. Most of this report deals with these subjects, which are central to defense planning. At this point, however, we need some definitions.

TYPES OF DEFENSE PLANNING

Classic Distinctions

The term "defense planning" has long been exceptionally ambiguous, because diverse activities fall under this umbrella term. In particular, we need to distinguish among: (a) development of national-level strategies and policies ("strategic planning"); (b) development of defense programs; and (c) operations planning, in both peacetime and crisis. Figure 1.1 provides a first view of how these are related. It shows strategic planning producing authoritative statements about broad strategic goals, declaratory policies, and planning scenarios. This leads to fiscal and acquisition guidance, and to nominal allocations of military forces across theaters. This strategic

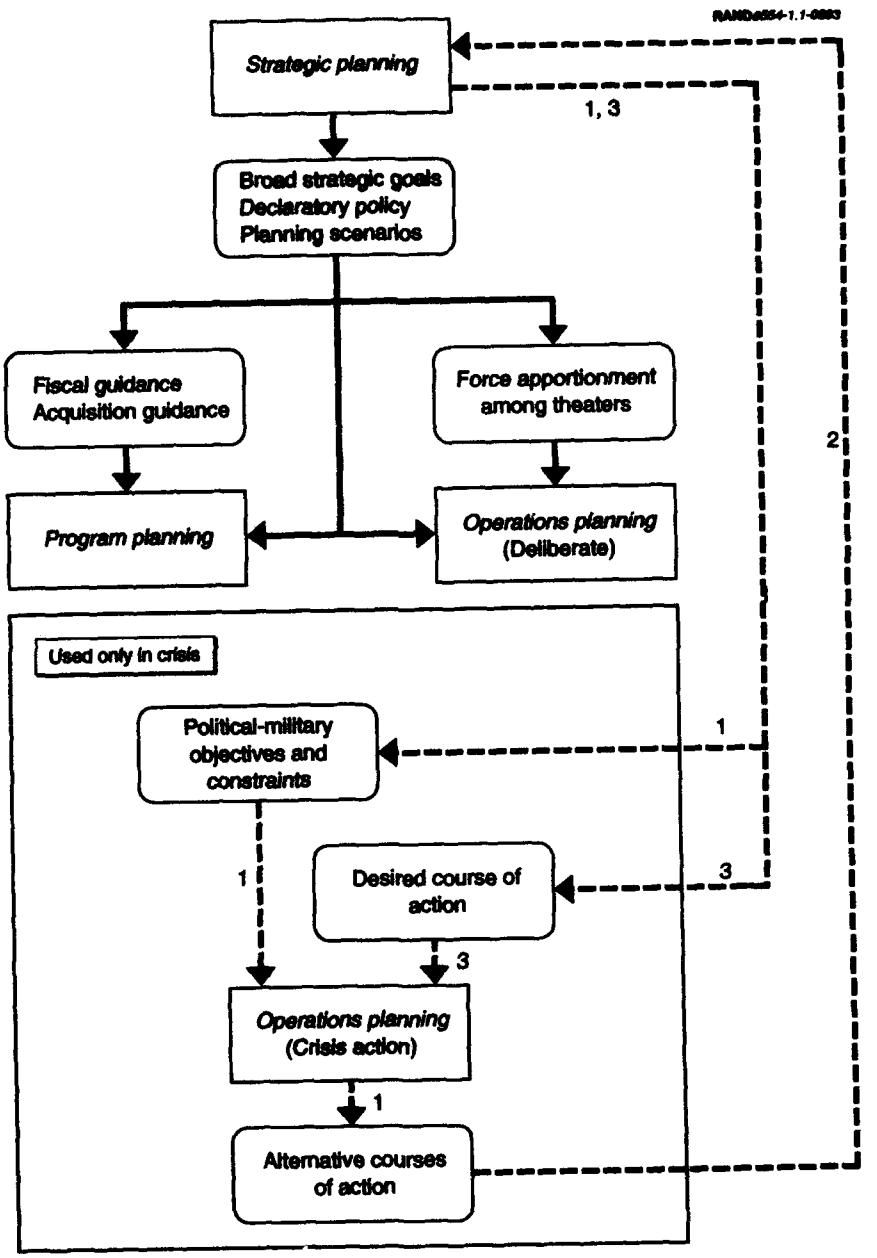

Figure 1.1—Relationships Among Types of Planning

guidance affects program planning and "deliberate" (peacetime) operations planning. In time of crisis, a rather different type of operations planning may proceed (see shaded-box region in lower half of figure). This reflects previous broad strategy (and, importantly, the insights that came in developing it), but depends also on specific guidance for the crisis. There are, of course, various iterations as shown, especially the development and presentation of *alternative* courses of action. At the outset (see arrows marked "1"), national authorities specify political-military objectives and constraints. Operations planners then develop alternative courses of action, which are then presented (arrow 2) for decision on the desired course of action, which then forms the basis (arrow 3) for detailed operations planning.

Although these types of planning should at least be consistent with one another (e.g., in making similar assumptions about national interests), there are many distinctions among them. The obvious one is that defense programs are concerned with providing *future* capabilities, while operations planning is concerned with employing current ones.[5] Figure 1.2 illustrates the different time horizons.[6]

Many other important differences do and should exist among these activities. In particular:

- *Special factors.* Operations planners should take into account "special capabilities" that may not exist in the future (e.g., ability to jam or evade particular radars, to use certain foreign bases covertly in emergencies, or to destroy communication facilities with special operations forces). Strategists and program planners often should not assume such capabilities—primarily because they may be only temporary and may depend on extreme security.

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[5]To be seen as relevant and important, strategic and programmatic planning should deal in significant part with decisions that need to be made "today" so that capabilities will exist later, during the time horizon of their responsibilities. If there are no near-term decisions to be made as the result of strategic planning, the planning itself will often not be taken seriously.

[6]This is our simplified depiction of an "eye of the planner" diagram developed by Col Clifford Krieger (USAF) of the National Defense University, who served previously as chief of the strategy division in the Joint Staff's J-5.

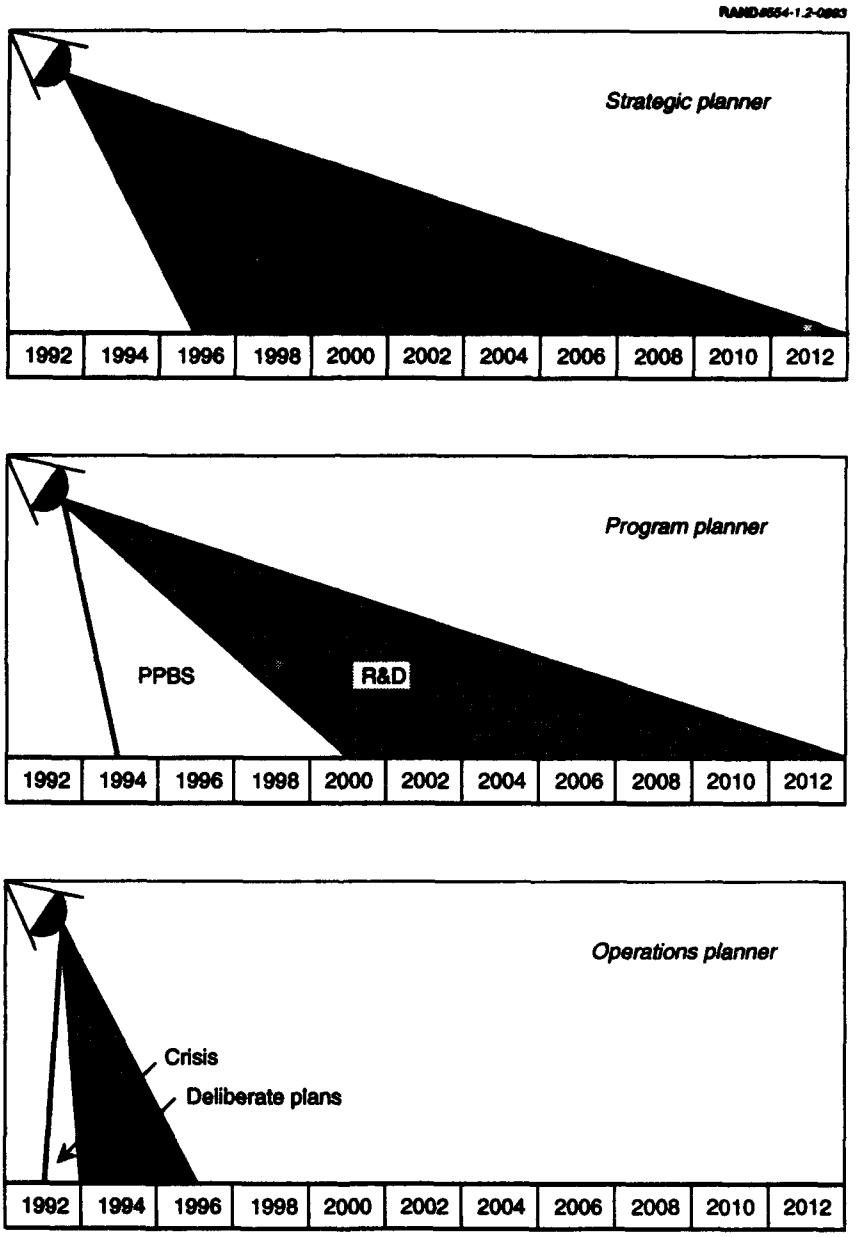

Figure 1.2—Different Planners Have Different Time Horizons

- *Qualitative factors.* Operations planners should exploit the qualitative weaknesses of our enemies and compensate for the weaknesses of our allies (e.g., incompetent pilots, incohesive ground forces, and an inability to maneuver adaptively). Program planners, however, should be cautious here, because pilots can be trained and better generals installed faster than many programs can take effect. Further, nations can choose circumstances in which the qualitative weaknesses of their forces are less important (as in 1973, when Egypt launched a highly rehearsed surprise attack across the Suez Canal and then dug in with good antitank weapons, rather than attempting to compete with the Israelis in maneuver warfare).
- *Providing resources vs. employing those resources.* As mentioned above, strategists and program planners should be primarily concerned with providing resources and broad aspects of strategy, while operations planners should be primarily concerned with employing those resources when the time comes—in context-specific ways.
- *Declaratory vs. actual strategies.* There often must be differences between declaratory strategies and likely employment strategies in the event of actual crisis or conflict. Although there are important matters of degree, most discussion of policy and programs must revolve around concepts that could be explained if leaked.[7] Thus, there may be distinct declaratory strategies, program-related strategies, and plausible actual strategies for the employment of forces.

While distinctions may be legitimate between operations and program strategies, those building defense programs (e.g., defense secretaries) can reasonably demand that the resources will be used intelligently, although not optimally. Indeed, they can often force

[7]The difficulties here are illustrated by the public criticisms in 1992 of a draft version of the Defense Planning Guidance (DPG), which was reported to have had a planning scenario involving efforts to defend Lithuania against Russia (Gellmann, 1992). As another example, the DoD initiated the Maritime Prepositioning Squadron (MPS) program in 1979 (FY 1980's program) after contemplating diverse contingencies that included an Iraqi invasion of Kuwait. This contingency, however, was deemed to be diplomatically sensitive, so public documents talked only about regional instability or the Soviet threat.

changes in doctrine and practice by providing too few resources to do the job without new methods of employing them (e.g., more effective joint operations, more effective coordination with allies on both combat and support, or an operations strategy focused on defense rather than deep large-scale ground-force maneuver).

Problems Caused by the Classic Distinctions

This separation of planning functions has long seemed natural to many observers, but it has also caused problems:

- *Compartmentalization and cultural schisms lead to incoherence.* Separating functions too starkly exacerbates natural tendencies to compartmentalize. So it is that civilian planning has often been dominated by high strategy or by methods of economics and systems analysis, while military planners have thought in terms of warfighting (or in terms of organizational practice as reflected in doctrine and lore). Communication has often been abysmal, and planning has suffered accordingly.[8]
- *Strategists and program planners must consider "real" scenarios and "real" strategies.* Although many have tried, civilian planners working *only* at the level of theaterwide force ratios and other aggregated concepts that remain at arm's length from the grubbiness of war cannot really do their job. To understand the resources needed, they must understand to some extent how they will be employed. Real wars seldom reduce to straightforward head-on-head engagement of "mass," and details can matter. Similarly, history is compelling in its evidence that real scenarios are often very different from what prevailing views expect beforehand: they are often inconvenient, messy, and even simultaneous with other crises (Winnefeld, 1992, p. 18).

[8]Improvements are under way, however. Since the Goldwater-Nichols act, the Chairman of the Joint Chiefs of Staff (CJCS) has had a special role in straddling this gap. Also, there is now an Assistant Deputy Under Secretary for Policy (Plans) (currently a retired Army lieutenant general with previous experience as the DJ-5). One of his principal roles is coordinating with the Joint Staff on contingency planning.

The Need for "Operational Thinking" in Strategic and Programmatic Work

A major problem, then, is that strategists and planners cannot do their job working solely at levels of abstraction such as broadly written planning scenarios. To understand what resources are *truly* needed, and how that depends on political and military strategy, they must also understand the basics of military strategy and operations. They should also be familiar with historical experiences, which often weigh heavily in the thinking of senior military officers. If they do not, they will: (a) undervalue many capabilities that could be crucial to real-world operations; (b) misassess what is feasible and where "real" difficulties lie; (c) find that the value of their resource-providing efforts is diminished by failure of the military to understand and use the resources wisely; and (d) cause troubles in operations planning by imposing constraints (sometimes unintentionally) that could mean failure instead of victory in time of conflict.

Let us give some examples:

- *Undervaluing.* Because many strategists and planners in the 1970s and early 1980s believed too strongly in the image that real war would be a purely defensive war of attrition, they saw no value (and political danger) in operational-level capabilities for offensive maneuvers.[9]
- *Frustrated plans.* Despite the excellence of the concept, the DoD POMCUS program of the late 1970s and early 1980s was much less effective than intended and advertised because shortfalls in equipment were not allocated intelligently across units (i.e., all units had serious initial shortfalls, while a different allocation would have assured that at least some of the units would have been fully ready to fight). This also frustrated efforts to improve the apparent balance, despite considerable investment.

[9]During the early discussions with Europeans of the Conventional Forces in Europe negotiations, many individuals insisted that NATO both defend forward and refrain from developing operational maneuver capabilities or capabilities for follow-on forces attack (FOFA). Implicitly, they were conceiving war as being a pure head-on-head battle of attrition fought in an extremely narrow slice of terrain along the border.

- *Unreasonable constraints on operations planning.* NATO's rigid forward-defense layer-cake strategy gave military planners minimal flexibility for detailed development and exercise of alternative strategies that might have been necessary in actual conflict.

The other side of this coin is that if the "operators" are not familiar with the innovation and efficiency oriented notions of the other planners, they will fail to recommend wise purchases or to exploit the resources available to them. The irony here has been well stated by Kaufmann (1986):[10]

> Planners must be able to tell policymakers where one type of capability can substitute for another and why some combination of these capabilities may be more efficient than others. *In principle, knowledgeable military men and women are better qualified to offer these kinds of insights and assessments than anyone else.* Currently, however, a number of obstacles stand in the way of their doing so. The biggest rewards go to the officer who shows an aptitude for command and versatility; the specialized skills needed for staff work, and force planning in particular, are not encouraged or even given serious recognition. To the extent that the art of planning is taught, the student is exhorted to describe the threat, formulate the objective, and state the requirement needed to reach the goal. If costs are considered, they enter only after the requirement has been established. As for marginal utility, it rarely affects the solution at all (p. 56, emphasis added).

For these reasons and more (Davis, 1985), all of the planners should to some extent be able to speak the same language and understand the same issues when that is appropriate. They should understand the principal concepts of higher-level force employment and realistic crisis and wartime operations. This is particularly important in the post–Cold War world, for reasons we will discuss later.

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[10]One of the first principles of program analysis has long been to recognize that "requirements" are seldom any more than "desires" or "goals." This is a good example of a cultural disconnect, because many mid-level military officers take "requirements" literally and consider failure to provide for them to be "civilian politics." The civilian planners, by contrast (and also military planners trained in systems analysis methods), question the validity of the "requirements" and ask how much additional leverage will be provided by the marginal dollar.

We also believe that the various types of planners should participate jointly in regular political-military-economic exercises to expose all of them to the kinds of issues that arise in real crises and conflicts (see, e.g., Davis and Arquilla, 1991b). One learns from such work, for example, that: (a) policymakers are extremely reluctant to make decisions early about their courses of action or objectives; (b) military leaders are extremely reluctant to commit forces without such clear objectives; (c) deterrence is very difficult and often demands prompt and decisive action; (d) prompt and decisive action can come across to the Congress, public, and allies as provocative and dangerous; (e) allies will often not cooperate when we want them to, and which allies will and will not cooperate is difficult to predict far in advance; (f) the usual tendency of policymakers in crisis is to begin with political and economic measures, and to follow up with military measures only when the former have failed; and (g) a more enlightened policy would better orchestrate those instruments of power for maximum effect from the outset. More generally, one learns from such gaming that "real" scenarios often fail to develop as had been commonly envisioned beforehand. All of these considerations should affect planning.

APPROACH

With this background, then, we proceed as follows. Chapter Two discusses broadly the implications for defense planning of world changes over the last several years. Some of the considerations will already be familiar, but others may not. In particular, it is not always recognized how pervasive the effects of the Cold War were in shaping the very nature of our planning and analysis systems: the way we framed issues, the options we considered, and the methods of analysis we used for evaluations. Much of this should change in the new era (and much of it is already changing).

Against this background, Chapter Three discusses the essence of the problem for post–Cold War planning: learning how to plan and adapt quickly under massive uncertainty. In this chapter we introduce and define the concept of a scenario space, which we then use throughout the report as an alternative to focusing on one or a few defense-planning scenarios. We also describe here the substantial reforms introduced recently by the Joint Staff. In Chapter Four we

discuss ways to build on these reforms in further improving the planning system. We recommend changes in organization, the nature of OSD guidance, planning methodologies, analysis techniques, and tools.

In Chapter Five we discuss implementation strategy, pointing out obstacles to change and suggesting techniques to overcome those obstacles. What we propose is not an all-or-nothing proposition, and the Joint Staff can do considerably more on the authority of the Chairman alone. Nonetheless, some of the far-reaching changes we suggest would require the interest and attention of the Secretary of Defense, the National Security Adviser, and key members of Congress.

Chapter Two

IMPLICATIONS FOR DEFENSE PLANNING OF WORLD CHANGES

The United States and its Department of Defense have already made dramatic post–Cold War changes in defense planning and military operations.[1] But many aspects of planning should and will continue to change for a long time, since transitioning is not a simple one-time matter, but rather one that involves revisiting fundamentals of mind-set, strategy, doctrine, and procedure. To appreciate this we first need to review traditional defense planning—i.e., to appreciate the legacy of the 40 years of cold war from which we must now escape. Much of this discussion will be important in subsequent chapters when we discuss the need for not only a different type of planning, but for new methods of analysis. Because the chapter is a long review, some readers may wish to skim it the first time through, except for Tables 2.2–2.4 at the end of the chapter, which summarize the main points.

[1]To appreciate the changes already under way, compare Cheney (1992) and Powell (1992) with comparable SecDef and CJCS reports from the mid-to-late 1980s. The new approach includes a regionally structured strategy that treats contingencies in Europe as only some among many that must be considered and an emphasis on generic scenario classes (major regional contingencies [MRCs] and limited regional contingencies [LRCs]). The National Military Strategy highlights: (a) *foundations* (strategic deterrence and defense, forward defense, crisis response, and reconstitution); (b) *strategic principles* (readiness, collective security, arms control, maritime and aerospace superiority, strategic agility, power projection, technological superiority, and decisive force); and (c) *basic elements of planning and employment* (regional focus, adaptive planning, nuclear weapons for deterrence and a hedge, generalized forward presence, conflict resolution, and planning for global conflict in a reconstitution context). While nearly all of these items have antecedents in previous strategy, the repackaging is significant.

A CAUTIONARY PREFACE

In most of this chapter we will be describing the mind-sets and methods that dominated the *practicalities* of strategic, programmatic, and even operations defense planning for three decades, from roughly 1961 to 1990.[2] It is this legacy that we must shake off. It is important to record, however, that defense planning was never as simpleminded as some would have it or as our subsequent discussion might suggest without this preface. Much of this report is about planning under uncertainty and being prepared for a vast range of potential contingencies worldwide. However interesting it would be to claim that these were new concepts and that planners prior to 1990 were exclusively focused on a simple depiction of the Soviet threat, the truth is otherwise—at least intellectually, and at least with respect to candid internal DoD discussions rather than those highlighted in the public domain, where dwelling on simplified depictions of the Soviet threat always seemed to be more politically correct and politically effective. Appendix A reviews briefly the views of secretaries of defense over 30 years, all of whom emphasized planning under uncertainty and sought flexible capabilities.[3]

DOMINANT PARADIGMS OF CLASSIC DEFENSE PLANNING

Despite policymakers having recognized *intellectually* the desirability of planning under uncertainty and being prepared for diverse contingencies worldwide, DoD planning between 1961 and 1990 ended up revolving around a few counter-Soviet and countercommunist concepts and contingencies. The numerous attempts to broaden scope and introduce flexibility were seldom successful, seldom going much beyond studies, SecDef exhortation, and lip ser-

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[2]This corresponds to the period from the start of the Kennedy administration to President Bush's speech in Aspen, Colorado on August 2, 1990, which announced the shift of American defense planning toward a regional strategy. Congressional demands for such changes also occurred in 1990 (see especially Nunn, 1990).

[3]It was also during the latter years of the Cold War that analysts came to use gaming and interactive exercises routinely as a way to study war in its entirety, to better appreciate political-military context, to elevate the visibility of the operational level of warfare, and to emphasize the likely and possible strategies and tactics of adversaries (and allies). All of these developments laid the basis for the adaptive planning we discuss in this study.

vice.[4] In particular, the services continued to train their commanders and staffs, and to equip their forces, with only minimal attention to nonstandard scenarios. Operations planning was for the most part similarly narrow. The *practicalities* of defense planning revolved, then, around the concepts and images of standard threats and standard wars.

A Monolithic Threat and an Idealized Concept of War

Throughout the Cold War era and despite occasional forays into thinking about non-Soviet contingencies (including Vietnam), military planners largely focused on deterring and possibly fighting a cataclysmic war in which the Soviet Union and its allies would be pitted against the U.S. and its allies. Even though the perceived likelihood of war with the Soviet Union was low, the *dominant* image—i.e., the image that shaped doctrine, training, operations planning, and force building—was remarkably stereotyped: a cohesive Warsaw Pact would invade a cohesive NATO with the objective of conquering all or most of Western Europe. In the late 1970s and early 1980s the image was further sharpened as Secretaries of Defense Brown and Weinberger noted that the Soviet Union appeared to have developed capability for aggression in several theaters (Central, Northern, and Southern Europe, Southwest Asia, and the Far East) and that U.S. planning should consider the possibility of more-or-less simultaneous wars in Southwest Asia and Western Europe (Brown, 1983). Weinberger (1981) went further and emphasized that if the Soviet Union went to war in one region, the U.S. might itself broaden the scope of war—i.e., escalate "horizontally"—to permit counteroffensives in regions of alleged Soviet weakness. Other reports suggested that these actions might include the high seas, Soviet naval bastions, remote areas of the Soviet Union such as the Kamchatka peninsula, and Soviet allies or proxy states such as Cuba or South Yemen. This would be a war fought for cosmic objectives with few constraints, a war that might escalate into general nuclear conflict.

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[4]Kaufmann (1982, p. 19ff) argues that the pressures to focus on the principal threats (e.g., the Central Region), to tie down forces in particular theaters, to buy combat forces rather than strategic mobility, and to specialize training for the principal theaters all worked against versatility.

The imagery of idealized and cataclysmic war was dominant in both the West and the Soviet Union. Neither side's planning dwelled much on the complications that bedevil military leaders in more "normal" wars (e.g., recalcitrant allies, agonizing decisions about limited objectives and compromise as part of war termination, or dealing with the consequences of a surprise attack).[5] Indeed, many deemed it important for deterrence to emphasize the all-or-nothing character of war should it occur. The principal exception to this was that from the 1960s onward some defense planners rejected the view that war would inevitably become nuclear. American civilian planners increasingly emphasized conventional defense, and by the 1980s, Soviet military planners were doing so as well.[6]

The monolithic-threat-and-ideal-war paradigm dominated mindsets of military planning for four decades. While some analysts *always* argued we should do so,[7] we are now in an era in which defense planning *must* focus on distinctly "nonideal" wars, wars that are messy in numerous dimensions: uncertain allies, uncertain objectives, conflicting objectives, a wide variety of political constraints such as avoiding American casualties (and perhaps "excessive" opponent casualties), and so on (see especially Cohen (1984) and Hosmer (1987)). Although military leaders will continue properly to argue that U.S. armed forces should not be employed in war without the nation's having first established clear objectives and the determination to accomplish them, the reality may not always be so ideal. There is consensus that we should avoid Vietnams, but that provides only limited guidance, as the current debate (January 1993) about coalitional intervention in the former Yugoslavia attests.[8]

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[5]There were some significant exceptions. Secretary Brown and his Under Secretary for Policy, Robert Komer, issued planning guidance for contingency planning, which specified sensitive best-estimate assumptions to be used in operations planning. Such guidance was revived under Secretary Cheney. All of this was consistent with the Goldwater-Nichols Act, which requires the Secretary to issue a Contingency Planning Guidance (CPG).

[6]See Davis and Stan (1985, p. 24ff) for discussion and citations.

[7]We include ourselves in this group, but see also Iklé and Wohlstetter (1988) and other reports from the Commission on Long-Term Integrated Strategy.

[8]Summers (1984) is a passionate discussion based on the Vietnam experience of why the U.S. should not commit forces to combat without clear objectives and the requisite

Strategic Planning for n-1/2 Wars, with Others as Lesser Included Cases

Secretaries of defense always understood that there were threats other than that to the Central Region. There emerged in the 1960s a concept of planning for two major wars and a relatively minor contingency, for a total of 2-1/2 (see Kaufmann (1982), Schlesinger (1974), and Appendix A). The motivation for this concept was the potential for conflict with the Soviet Union, China, and some minor nation such as Cuba. By the time of the Nixon administration, however, there was a willingness to accept the reality that the U.S. could not realistically plan to fight two major wars simultaneously, much less that plus a "half war." Further, improved relations with China made it unnecessary to pretend. In his Guam speech in July 1969, President Nixon announced what amounted to a *one*-and-a-half-war strategy.[9] Planning could therefore focus largely on the Soviet threat to Europe, while leaving room for a lesser contingency elsewhere. Although Secretary Weinberger later decried the imagery of wars and half wars (Weinberger, 1981), the imagery persisted and appeared to many observers to describe de facto U.S. policies (the Central Region was seen as the location of the full war, and Southwest Asia was seen as the location of the half war).

Another continuing theme of Cold War defense planning was that given forces developed for the most stressing cases, we could deal with other wars as *lesser included cases.* The shortcomings of this approach were sometimes recognized (e.g., Schlesinger, 1974) and attempts made to deal with specialized aspects of the "other" challenges, but they were typically small and inconsistent sideshows, with the notable exception of the Kennedy-era emphasis on Special Forces and limited wars, and the creation of a Special Operations

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domestic consensus and determination. Summers' views represent those of an entire generation of American military officers. In the 1980s, Secretary Caspar Weinberger expressed similar views (the Weinberger doctrine).

[9]There is a sense of déjà vu in reading Nixon on this (Nixon, 1978, p. 395): "The Nixon Doctrine . . . was misinterpreted by some as signaling a new policy [of] . . . withdrawal from Asia. . . . I emphasized that [it] was a formula . . . that provided the only sound basis for America's staying *in.*" Nixon felt that the key element was that the U.S. would continue to provide arms and materiel, but not the personnel, for defense of allies willing to supply the manpower necessary to defend themselves.

Command in the Reagan administration.[10] As examples to illustrate the pervasiveness of the focus on Europe and global war, consider that as of the late 1970s, the U.S. had no mountain infantry, no ability to provide purified water to more than a small number of expeditionary units in places such as Saudi Arabia or Iran, and helicopter blades that were highly vulnerable to desert dust. Although measures to correct these shortfalls were undertaken in the 1980s as the U.S. became concerned about possible wars in Southwest Asia, there was considerable resistance to taking defense of the region seriously, despite pressure from the Under Secretary for Policy and the Secretary of Defense.[11] And throughout the 1980s there was congressional resistance to many measures that would be useful for lesser contingencies (Gorman, 1988a,b).

Today, the 1-1/2 war strategy makes no sense. As reflected in the Chairman's Military Net Assessment and the Defense Report since late in 1990 (Powell, 1991, Cheney, 1992), a major war in Europe with Russia is not obviously more likely or threatening than other wars. Further, Russia's potential as a military threat to Western Europe is far more modest than was that of the Soviet Union: Western Europe now has Eastern Europe as a buffer, the non-Soviet former members of the Warsaw Pact would be likely to fight the Russians rather than assist them, the Soviet Union itself has disappeared, Russia has greatly reduced its military expenditures and readiness, and the Russian army is reportedly in disarray. It follows that concepts such

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[10]For discussion of such special requirements, see Gorman (1988a,b) and Winnefeld and Shlapak (1990).

[11]Some resistance was from particular strategists who believed that war would become global, in which case the U.S. would not realistically be able to defend in the Persian Gulf region. They argued that such an invasion should be deterred with a strategy that would escalate horizontally. Others resisted efforts in Southwest Asia because they believed the real prize was Western Europe and that the balance there was so fragile that even the relatively small commitment of forces envisioned for Southwest Asia would endanger NATO. Still other strategists (such as ourselves) believed that deterring (or even, perhaps, defeating) a Soviet invasion of the Persian Gulf region was feasible because of the distances and logistical hardships the Soviets would face in attempting to reach the oil-rich regions of southern Iran and the Arabian peninsula (see, e.g., Brown (1980) and Carlucci (1989); see also Epstein (1981)), especially if Iranian resistance were significant and coordinated to some degree with U.S. efforts, especially air power (Levine, 1985). They also believed that failure to plan publicly for defense in Iran would be disastrous negative "environment shaping" of a sort that might encourage Soviet aggression and weaken Saudi resolve (Davis, 1982).

as the 1-1/2 war strategy no longer apply. The closest approximation would be a requirement for two concurrent "half wars." In our view, however, the more fundamental arguments for force levels at or only somewhat below those envisioned by the DoD in 1991 (the Base Force) relate to "environment shaping" in the form of not creating military vacuums in the Far East or elsewhere, vacuums that might set off unproductive and dangerous arms races among China, Japan, and Korea.[12] Environment shaping was a major rationale in Cheney (1992). Table 2.1 indicates an effort (Winnefeld, 1992) to enumerate global and regional objectives for the post–Cold War era.

Table 2.1

Regional Breakdown of Higher Level Defense Planning Objectives

	East Asia	Europe	Middle East	Elsewhere
Environment shaping (long term)	Creating conditions where no single power *is seen* as military hegemon	Creating conditions where no single *power is seen* as military hegemon	Demonstrating that access to resources is *vital U.S.* interest	Precluding rise of major military *power*
	Making arms races unnecessary	Making arms races unnecessary	Demonstrating that U.S. and Arab security interests are not irreconcilable	Improving security climate
	Encouraging orderly change	Encouraging orderly change		
Deterring threats (near and *midterm*)	Korea, sea lanes of communication, residual CIS	Residual CIS	Iraq, Iran, Libya, sea lanes of communication	Protecting U.S. citizens, property
Responding to contingencies (near term)	Korea	Residual Europe, Libya	Aggression in Gulf, against Israel, U.S. citizens	Drug traffic, counter-subversion, counter-terrorism

[12]This has been a continuing theme of RAND work. See Davis (1989a), Winnefeld, Pollack, et al. (1992), and Levin and Bracken (forthcoming).

Strictly Defensive Strategy

Strategically Defensive Postures. An exceedingly important paradigm throughout the Cold War was the notion that the U.S. and its allies would always be on the strategic defensive, at least initially, and should posture forces to make the defensive orientation manifest. This followed logically from the objectives of containment and deterrence. So it was that we created and trained forces to deter and defend (but not to fight and win) in Europe's Central Region, Korea, and elsewhere. Although our armored forces are inherently capable of offensive operations, the U.S. and its allies pointedly did not develop the force structure (including support units and stocks) that would have been necessary for aggressive actions such as an invasion of the Soviet Union. Furthermore, until the 1980s, the service doctrines and training emphasized defensive operations across the board. The Army's introduction of Air-Land Battle concepts was extremely controversial, especially with our European allies, because it implied offensive operations, albeit in the context of theater-level defense.

In the 1980s, Secretaries Weinberger and Carlucci departed from purely defensive language by noting in their posture statements that if war with the Soviet Union began, the U.S. might choose to expand its scope with counteroffensive operations in regions of its choosing. This was highly controversial at the time. In a related matter, the Navy's introduction of maritime strategy changed emphasis from hanging back and defending sea lanes of communication (SLOCs) to destroying threats to those SLOCs as forward as possible. Aspects of the maritime strategy were always dubious strategically (e.g., the concept of sending carrier battle groups into waters well protected by Soviet defensive forces) (Komer, 1984), but other aspects had intuitive appeal, notably using our strength (naval forces) to attack Soviet weaknesses (exposed forces and territories) while maintaining the initiative, which might cause the Soviets more trouble strategically than one might expect from a more quantitative assessment.[13] Apart from the strengths and merits, the debate's intensity illustrated how

[13]For discussion of the maritime strategy, see especially West (1985) and a later and authoritative piece by Admiral Watkins (Department of the Navy, 1987).

deeply ingrained was the defensive mentality.[14] Not surprisingly, contingency planning for possible conflicts in Southwest Asia had always dealt with defensive operations. This changed overnight with Desert Storm.

An Operations Strategy of Forward Linear Defense. Not only did the U.S. and its European allies focus on the strategic defensive during the Cold War, they focused increasingly on a particular operations strategy calling for a forward defense close to the border of West Germany, with all national forces having assigned locations at which to fight (the so-called layer-cake defense shown in Figure 2.1). This was not deemed feasible in the 1950s, but was becoming feasible and was accepted as a firm political-military requirement in the course of the 1960s and 1970s,[15] even though such a defense was considered fragile by many military strategists because of NATO's inadequate operational reserves and the potential for early breakthroughs due in part to operational surprise (Davis, 1988a,b).[16] Forward linear defense was so ingrained in the psyches of Western military planners that alternatives were seldom discussed.[17] NATO gave little emphasis to operations-level maneuver: since it had been agreed politically where the various forces would fight, there was little reason to do so.[18] A forward linear defense was also planned in Korea, and defense of Iran was usually discussed in terms of a kind of linear de-

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[14]By contrast, Soviet military thinking truly was *strategically* defensive (not surprising, given the history of Russia's being invaded from the West), but made no bones about emphasizing the importance of counteroffensive operations with ambitious objectives with respect to Western European territory (see, e.g., Kokoshin et al. (1989) and Hines and Mahoney (1991), which reviews Soviet doctrinal thinking and how it changed in the 1980s).

[15]See Romero (1991) for a history of forward defense.

[16]The rationale for the forward-defense strategy included the claim that it was less expensive, since an alternative strategy giving up space for time initially would require larger overall force structure adequate to permit a counteroffensive (Kaufmann, 1982, p. 8).

[17]For an authoritative picture of defense planning in the late 1970s and early 1980s, see Office of the Secretary of Defense (1979a,b). For contrasts of forward-linear defense and other concepts, see Kugler (1992a) and Davis (1990).

[18]Senior military leaders surely considered such matters, but there was little if any detailed planning or exercises. This was a major problem with NATO's WINTEX and HILEX exercises, in which political constraints dominated military reasoning.

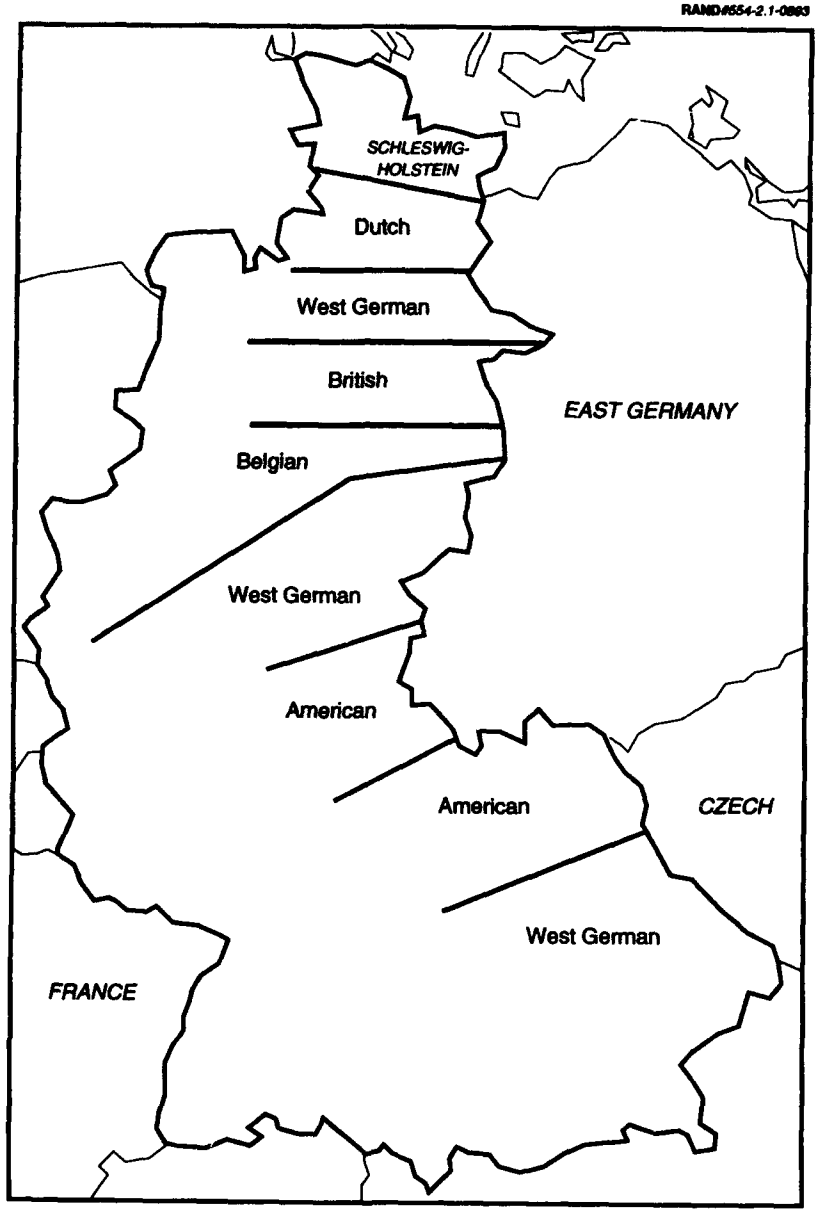

Figure 2.1—NATO's Layer-Cake Defense of the Old Central Region

fense in the Zagros Mountains, although that description was never accurate because of the nature of the terrain and force imbalances.

Domination of Ground Combat

In most of World Wars I and II, Korea, and Vietnam, ground combat dominated campaigns. Air power was significant, but in a supporting role.[19] Military planners continued to think of war in this way throughout the 1980s, long after U.S. air forces had gained enormous ground-attack potential. The reasons were complex and included not only the tendency to fight the last war, but also concerns about the survivability of air forces given high-density modern air defenses and the Israeli experience in the 1973 Yom Kippur War. More generally, one of the lessons learned from Korea and Vietnam was that there were distinct limitations to what could be expected from air power.

ANALYTIC CONSEQUENCES OF CLASSIC PARADIGMS

Although even laymen with only passing interest in military affairs are aware of how the classic paradigms (monolithic threat, global war, strategic defense, etc.) have become obsolete, it is much less appreciated, even among professional military officers and civilian planners, that these paradigms shaped the U.S. approach to defense planning *analytically*, and continue to do so. One of the principal assertions of this study is that we have yet to make some of the most important transitions in thinking. Let us now review some of the analytic consequences of the classic paradigms.

Emphasis on Military "Balances"

Because of the constancy of threat and emphasis on military stability and deterrence, much of the DoD's thinking during the Cold War revolved around assessing and improving the various regional and global military balances. With some exceptions, most balance assessments dwelled on "bean counts" and other measures of the bal-

[19]One important exception was the Pacific campaign, in which U.S. ground operations served primarily to secure islands needed for air operations.

ance of resources over time, rather than the likely and possible dynamics or outcomes of conflict.[20]

Separate Ground, Air, and Naval Balances

Because it was so unclear how air forces would affect combat, and for obvious organizational and historical reasons, defense planning largely treated ground, air, and naval forces separately. The only exception here was that wargames and simulations often recognized air forces as a source of firepower. They seldom appreciated the potential effects of air forces on operational-level or tactical-level maneuver.[21]

Assumed Comparability of Qualitative Capabilities

Although Soviet forces performed much more poorly at the tactical and individual level than German or Allied forces in World War II, there was no clear-cut basis for believing this would be the case in a World War III. Indeed, Western military experts had great respect for Soviet military forces, doctrine, and equipment—not to the point of being willing to trade, but to the extent of seeing a formidable opponent in all respects. While revisionist historians will claim this was merely propaganda to improve budgets, the reality is more complex. There were hard data, for example, on the quality of Soviet ICBMs, tanks, and automatic rifles. Further, Soviet military doctrine was and

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[20]See *Levin (1988)* for a comprehensive review of balance assessments as of January 1988, and an attempt to go "beyond the bean count." Davis (1988a) was developed for the Levin study and reflected an unusual multiscenario warfighting-oriented analysis conducted for Fred C. Iklé, then Under Secretary for Policy. The Director of Net Assessment also conducted a major warfighting study that went well beyond "bean counts."

[21]The limited treatment of air forces can be seen in many writings, such as Office of the Secretary of Defense (1979a,b), Mako (1983), Kaufmann (1986), Epstein (1990), Congressional Budget Office (1980, 1988), and many studies by RAND, the Institute for Defense Analyses (IDA), and other organizations. Air power was given a substantial countermaneuver role and depicted as having more strategic significance in Levine (1985), Davis and Howe (1990a, appendix), Shlapak and Davis (1991), and Dupuy (1990). Within the government, Air Force Colonel John Warden was the leading spokesman for the potential role of air power, from at least 1980 onward to our knowledge (Warden, 1989). More recently, there have been a number of expositions on the role of air power (e.g., Department of the Air Force, 1991; Buchan, Frelinger, and Herbert, 1992; and Bowie, Frostic, Lewis, Lund, Ochmanek, and Propper, 1993).

is "serious" and impressive in many respects. Indeed, *large-scale* Soviet military operations in World War II had been of very high quality, and the Soviets thoroughly defeated Hitler's forces on the eastern front. And although the Soviets continued to lag the West in high technology, they often deployed moderate-quality systems at the same time that the West was still *talking* about deploying higher-quality systems in quantity. For all of these reasons as well as budgetary convenience, Western military leaders consistently assumed that the military balance was dictated by equipment and forces, and that the sides should be considered to be comparable on a soldier-for-soldier basis.[22]

An important consequence of this was that American (and NATO) military planning largely ignored issues of enemy competence and fighting enthusiasm, even when applied to non-Soviet members of the Warsaw Pact, North Korea, or Iraq.[23] This numbers-oriented mind-set prevailed, especially for ground-force analysis, despite historical evidence indicating that differences in fighting quality can be equivalent to factors of two or three in numbers (Dupuy, 1990), and despite earlier British traditions.[24]

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[22]A few analyses examined different assumptions, notably assumptions in which non-Soviet Warsaw Pact forces were assumed less effective or in which Warsaw Pact reserve forces with only thirty days of refresher training were considered much less effective on the attack than active forces. These studies demonstrated that such considerations could greatly alter conclusions about the balance and reverse conclusions about which scenarios were the most worrisome (Davis, 1988a,b).

[23]Some analysts did consider qualitative factors. See in particular Dupuy (1990). John Mearsheimer of the University of Chicago predicted, in a short and acerbic op-ed piece, that the Iraqis would be defeated extremely fast because of qualitative asymmetries. Analysts in the British Defense Operations Analysis Organization (DOAE) reached similar conclusions and predicted very low coalition casualties as the result of using qualitative factors in their analyses, which were greeted with hostility by military authorities in both the U.K. and the U.S. One of us (Davis) had similar experiences before Desert Storm when showing sensitivity analyses that contemplated less-than-nominal Iraqi capabilities. These are mentioned obliquely in Shlapak and Davis (1991, p. 6).

[24]One of us (Davis) was able to make an independent (unpublished) assessment of the quality issue using Soviet casualty data from major eastern-front operations of World War II (see Stoeckli, 1985). The battle outcomes and casualty levels were highly consistent with predictions of the RAND Strategy Assessment System (RSAS), which had been calibrated against other historical data such as that of Dupuy and against earlier Army models. This consistency, however, was possible only if it was assumed that the fighting effectiveness of Soviet forces was about half that of German forces—at the tactical level—the same conclusion that Dupuy had reached many years earlier

In today's defense planning it would be absurd to ignore qualitative considerations, because so many of our potential adversaries are simply not in the same league as the United States with respect to the quality of their soldiers, sailors, or airmen. Nor are some of our recent and prospective allies. Importantly, it is not "conservative" to assume our opponents are more capable than they are, because doing so may deter us from taking measures promptly that could avert or defuse crisis, or end a conflict before it grows. Instead of such prompt action, we might convince ourselves of the need for a long buildup of overwhelming force. That, however, would result in a prolonged and expensive crisis and would give the opponent time to prepare and perhaps to avoid surprise.

Static Scores

One of the principal tools used for defense planning in the Cold War was the armored division equivalent (ADE) methodology, or what was later called the ED methodology.[25] This was a major advance over merely counting divisions (Enthoven and Smith, 1971), since some nations' divisions are larger than others' or have more modern and capable equipment. However, because the scores characterized equipment rather than the fighting quality of the men and their generals, they could still be misleading. Furthermore, static scores were and are based on some ill-defined notion of "average" circumstance, even though the effectiveness of a given unit varies greatly with details of terrain, posture of the defender, and the mix of forces with which and against which the unit was fighting. This rather obvious point was seldom emphasized explicitly because much DoD planning was more managerially than operationally oriented and it seemed tolerable to deal with some kind of "averages."

In the modern era we need more realistic and dynamic measures, such as those adjusting scores for situation (Allen, 1992a) and taking into account fighting quality. Figure 2.2 illustrates just how much difference this can make, drawing on the recent conflict with Iraq.

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using different data sources and mostly different battles. The Soviets were much more effective at the operational and strategic levels of warfare.

[25]For examples of this methodology, see Mako (1983), Congressional Budget Office (1988), and Epstein (1990).

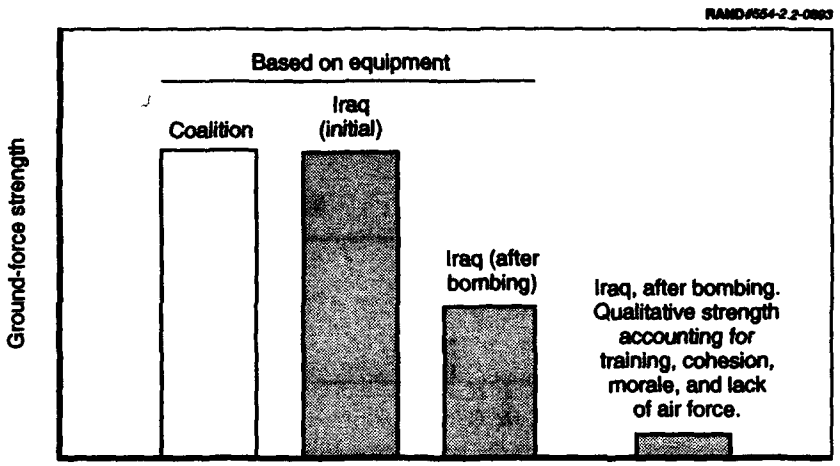

Figure 2.2—Schematic Illustration of Qualitative Effects

While the figure is schematic, it reflects roughly the kinds of qualitative effects assumed by the authors in work of this kind.

Stereotyped Official "Scenarios" with Simplistic Timelines

Probably because of the emphasis on deterrence and the belief that war itself was quite unlikely, military planning in the Cold War was strongly influenced by political considerations, organizational convenience, and "managerial" thinking. Actual warfighting seemed less important than reaching consensus with allies and making grand decisions about the level and nature of defense expenditures. For the sake of such decisions it was convenient and even necessary to develop illustrative scenarios by which to assess "How much is enough?" and "How are we doing?" These became the basis of civilian guidance to the military in the form of Defense Planning Guidance (DPG) scenarios (see also Appendix A). For example, the military was directed to develop programs, forces, and plans to conduct a forward layer-cake defense in the Central Region, one that would be adequate to assure successful *initial defense* conventionally, assuming a specified period of strategic warning and deployment. Figure 2.3 sketches such a planning scenario for an era in the early 1980s (see, e.g., Rathbun, 1992). This particular scenario, which uses rela-

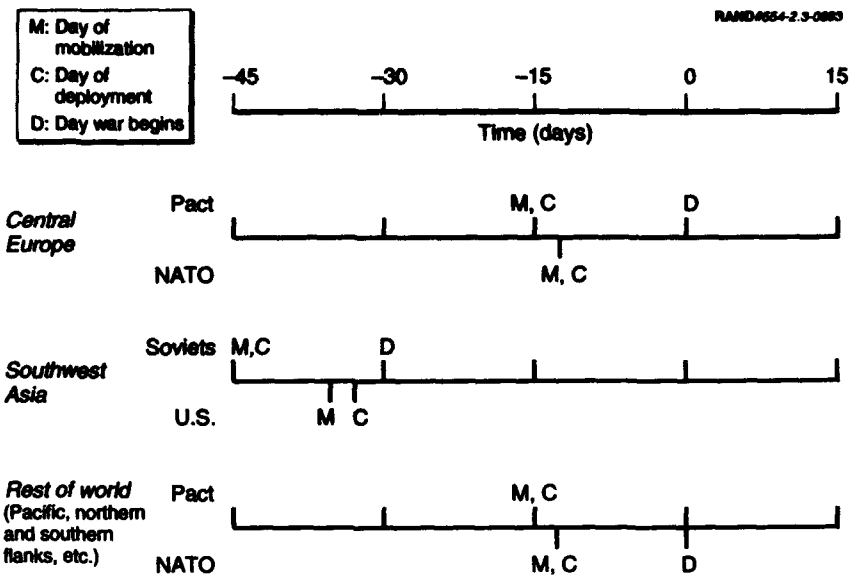

Figure 2.3—Simplified Depiction of a 1980s Defense Planning Scenario

tively arbitrary numbers that do not accurately represent the planning scenarios that were actually used, imagines that the Soviets begin to mobilize north of Iran on day 0; the U.S. begins mobilizing ten days later, and begins deploying forces a few days after that. The Soviets invade Iran after 15 days of mobilization. Fifteen days later they and their allies begin mobilizing in Europe and elsewhere.[26] NATO's mobilization and deployment of forces begins a few days later. The Warsaw Pact invades Europe 15 days after starting mobi-

[26]The 30-day separation of D-days illustrates "concurrent" conflicts. If the gap were zero (simultaneous D-days), the resulting "requirement" for strategic mobility assets would greatly increase. Issues of simultaneity and concurrency continue to be important in the post–Cold War era and are a key element in arguments for the Base Force or a force of comparable size. Our own view, based on thinking about the range of particular threats, is that a second contingency could—in many but by no means all cases—be dealt with initially by regional allies (if properly equipped with modern weapons such as MLRS/ATACMs) and U.S. air power and, later, by the call-up of reserve forces if necessary, at least if army reserve forces could reach high levels of readiness within a few months of training. This is discussed in unpublished 1991 work by Paul K. Davis, Steven Drezner, and Richard Hillestad. Similar views were expressed by then Congressman Aspin (Aspin, 1992a,b).

lization, day 45 of the overall scenario. The U.S. immediately opens conflict worldwide, including in the Pacific theater. For simplicity, this figure assumes that most deployments of forces begin at the same time as call-ups (i.e., most C-days are the same as D-days). A more representative scenario would be more complex, with delays between mobilization and deployment, partial mobilizations and partial deployments, readiness preparations short of mobilization, and so on (Joint Staff, 1990).

Although such scenarios were always intended by the Office of the Secretary of Defense to be merely illustrative, they have often been interpreted as defining "point requirements." Note that Figure 2.3 specifies particular times for strategic warning, mobilization, deployment, and the beginning of combat. Further, it assumes that mobilization is more or less an all-or-nothing decision for the U.S. and its NATO allies.[27]

While such scenarios are exceedingly useful for both defense planning and military planning, they become a serious problem when taken too seriously. This, in turn, is hard to avoid when similar scenarios are used over and over again over the years, developing an insidious mind-set about the way events will transpire if war comes. If war were actually to occur, it is unlikely that timelines and events would bear much relationship to such illustrative scenarios. For example, in the invasion of Kuwait, Saddam presented us with a scenario in which M-day and C-day actually *followed* D-day, by four days! Such a scenario should not have been surprising to planners, but to many it was.[28]

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[27]As Chapter Three will point out, the DoD has moved away from a single planning scenario such as that in Figure 2.3, now using a much larger number of scenarios that vary significantly in the challenges they pose (see Gellman (1992) and "Seven Scenarios," *Washington Post*, February 20 and May 27, 1992). These scenarios may be viewed as "more of the same" rather than a radical departure from the focus on rigid scenarios. The Joint Staff, however, has moved more radically, as will be discussed in Chapter Three.

[28]It is notable here that the J-5 staff was, as of early 1990, experimenting with relatively sophisticated ways of defining timelines for complex scenarios, including ones in which M- and C-days came after D-day, and in which mobilization and deployments were multistaged processes because of uncertainty during crisis and different degrees of flexibility enjoyed by the CINC, CJCS, SecDef, and President (Joint Staff, 1990). Current guidance to CINCs from the Joint Staff emphasizes the importance of treating the timelines as variable.

Requirements Analysis and Threat-Based Planning

Given the constancy of threat and the relative importance of managerial considerations, it was only natural that defense planning came to focus on "requirements analysis" that began with a characterization of threat, the positing of a worse-than-expected scenario, and the derivation of associated "requirements." Further, given the focus on numbers and equipment discussed earlier, it was only natural that the requirements analysis dwelled on issues such as "How many divisions are enough?" as a function of time. Figure 2.4 shows a representative example of this type of analysis,[29] one showing a postulated buildup of Pact forces ready for combat ("the threat"), a derived buildup of NATO forces that would be adequate, according to rule-of-thumb analysis, for successful defense ("the requirement"), and the buildup of NATO forces that would be possible without special defense programs to eliminate the "shortfall."

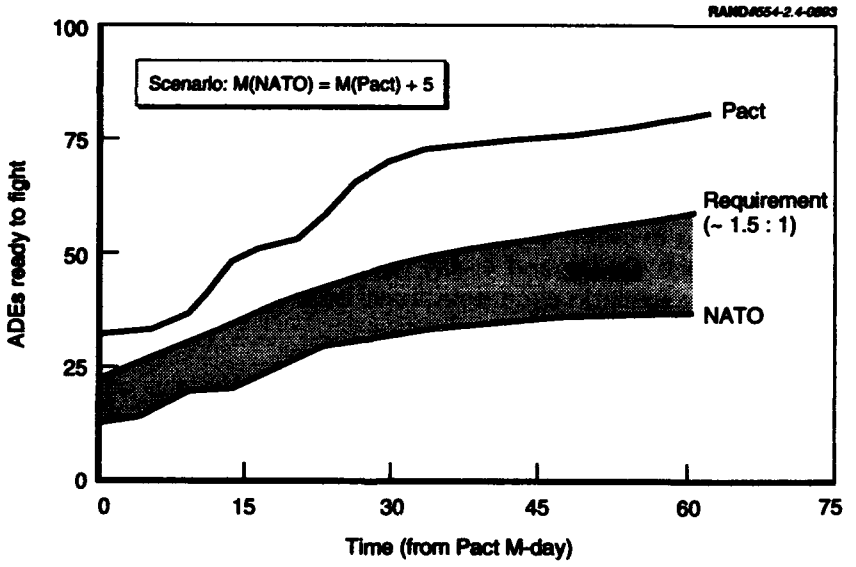

Figure 2.4—Illustrative Requirements Analysis from the Cold War

[29]For examples of such analyses, see Office of the Secretary of Defense (1979a,b), Congressional Budget Office (1980), articles in Miller and Lynn-Jones (1990), Thomson (1988), and, most recently, Kugler (1992b).

This rule-of-thumb analysis focused on theater-level force ratio, with ground forces measured in armored division equivalents (ADEs), units that take into account differences in the size and equipment quality of different divisions. A force ratio of 1.25 was considered to be adequate and a ratio of 1.5:1 marginally so.[30] This analysis concerned itself only with *resources*. Obviously, NATO might win or lose at a ratio of 1.5:1 depending on the quality of its generals and strategy, but the defense-planning decision was concerned primarily with providing adequate resources without unnecessary expenditures.

Consistent with the political context, planning assumed what was alleged to be a somewhat conservative scenario. In reality, the planning scenarios have always been bizarre mixtures of optimistic and pessimistic assumptions (Davis, 1985, 1988a).[31] They optimistically assumed that all NATO allies would mobilize in unison and follow preagreed plans, even though real-world circumstances would probably include enormous uncertainties and disagreements among allies.[32] At the same time, they pessimistically assumed that the non-Soviet members of the Warsaw Pact would mobilize and fight in response to Soviet orders. Similarly, they optimistically assumed that the U.S. would be able to deploy six additional divisions to Europe in ten days, but they pessimistically assumed that Soviet low-readiness reserve divisions would be employable in assault operations thirty days after mobilization.

Time-Phased Force Deployment Lists as a Focus for Planning

One of the most striking analytic consequences of Cold-War planning was the emergence of Time Phased Force Deployment Lists (TPFDLs)—i.e., the deployment schedule for all units going to a theater—as a central focus for planning. A typical military study might proceed as follows:

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[30]The basis for this is explained analytically in Davis et al. (1989) and Davis (1990).

[31]"Requirements analysis" has been very much an art form designed to provide requirements that could be achieved (barely) with fiscally feasible programs. The analysis also has to be palatable politically, both within the U.S. and with our allies.

[32]There were some exceptions, however, notably a "transition-to-war" study done for OSD by colleagues James Winnefeld, Dean Millot, and William Simon.

1. Define the political-military scenario (identifying the attacker, defender, alliance members, and timelines for warning, mobilization of both sides, deployment of both sides, and the start of war).
2. Define the assumed attacker strategy (e.g., main-thrust attacks, operational objectives, phasing, . . .).
3. Define the assumed defender strategy in response to the threat strategy, perhaps with some uncertainty.
4. Develop a TPFDL consistent with the priority of arrival times for different units.
5. Conduct a wargame (e.g., like the Total Force Capabilities Analysis of the Joint Staff).
6. Change elements of capability and iterate (e.g., assume additional sealift).

In this approach, the emergence of an agreed TPFDL is a key step, because this is the result of considerable negotiation among different groups. Once decided, the TPFDL is typically held constant. It is then used as the basis for very detailed calculations of logistics requirements, scheduling, and so on.

The insidious aspect of the TPFDL focus was and continues to be the encouragement of rigidity.[33] So long as one considers the TPFDL that emerged from some planning process to be "sacred," one is not operating in what anyone might reasonably call an adaptive mode. It is striking to note how much trouble was allegedly caused by General Schwartzkopf making changes in the TPFDL in the process of Desert Storm. The problems were minor from a strategic perspective, but to "the system" they came across as very disruptive—because mind-sets anticipated executing "the" plan.[34]

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[33]According to at least one experienced planner, this rigidity was due far less to the rigid mind-sets of the better planners than to technological problems: if one attempted to make changes, the computer systems of the time made doing so far more difficult than it "should" have been.

[34]A larger problem was that General Schwartzkopf was executing an operations plan (1002-90) that did not yet have an updated TPFDL. The TPFDL available had been developed for a different war in the same region.

Piston Models, FLOT Battles, Simple Maneuver

A consequence of our focus on the Central Region and forward defense with a layer-cake allocation of forces was that nearly all of the ground-combat models used in NATO were for many years of the "piston variety," in which combat was visualized as occurring in well-defined corps sectors, with the forward line of troops (FLOT) moving forward or backward according to the relative strengths of attacker and defender in the sector, with some effects of adjacent sectors as well. Some of these models became quite sophisticated, but all of them were designed for a type of warfare in which force densities are high and the axes of advance are well known. The models by no means precluded operational-level maneuver, despite contrary claims by analytically illiterate observers, but they did limit the nature of that maneuver and make it difficult to consider maneuvers different from those that had been considered canonical when developing the model's data base. As suggested in Figure 2.5, operational-level maneuver was largely construed to be an issue of deciding on which sectors to concentrate or counterconcentrate.[35]

By the 1980s, there were several models that encouraged a more maneuver-oriented view of the theater (e.g., IDAHEX and RSAS's S-LAND or CAMPAIGN-ALT model), but most analysis and planning continued to use piston-model derivatives such as CEM, TACWAR, VECTOR, and RSAS's CAMPAIGN-MT.

In contemplating the most plausible contingencies for the next 10–20 years, many observers believe that planning should emphasize network models in which maneuver and the limitations of infrastructure can be dealt with explicitly. In many developing nations, for example, the road networks are very sparse and limiting. Off-road movement is possible tactically, but logistics operations are road-bound.[36]

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[35]For military and mathematical discussion of concentration-counterconcentration issues, see Davis, Howe, Kugler, and Wild (1989), Davis (1990), or Biddle et al. (1991). Soviet planners used closely similar theories (Hines, 1990), even in operations planning (the so-called correlation of force methodology). These analytic theories are still relevant, but must be adjusted to allow for more mobile defense concepts (see, e.g., Kugler (1992a) and Huber (1993)).

[36]Two network-oriented models being used by RAND for such work are the CAMPAIGN-ALT and ITM models of the RAND Strategy Assessment System (RSAS)

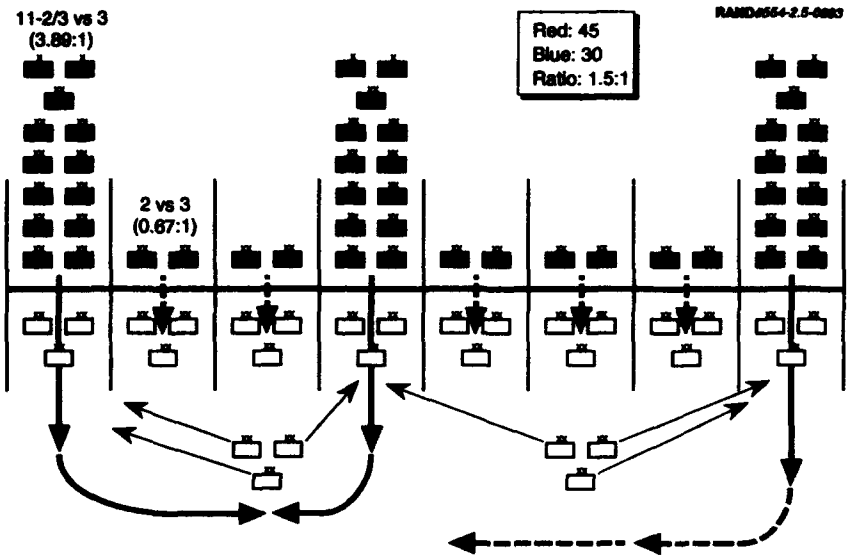

Figure 2.5—Schematic Representation of Concentration in Linear Combat

Air Power as Firepower and Participant in a Separate War

As noted earlier, throughout the Cold War military analysis seldom treated air power as affecting the ground war except that attack aircraft were assumed to kill ground-combat vehicles, subtracting them from the battle. Over and over again, studies indicated (as the result of dubious assumptions) that only close air support rather than battlefield interdiction aircraft had much impact. Only in a few studies was air power allowed to have more far-reaching effects on maneuver, movement rates, and ground-combat effectiveness.

LESSONS FROM THE GULF WAR

The Gulf War in 1991 was a watershed. To many of those who had been talking about a military-technical revolution, this was evidence

(see, e.g., Allen and Wilson (1987) and Bennett (1992), and an emerging model called TLC/NLC being developed by Richard Hillestad).

that the revolution had in fact already arrived. Anecdotal accounts of Soviet military officers reviewing results of the war describe ashen faces because their worst fears had been realized, and more: U.S. military forces and equipment were awesomely powerful. To be sure, Soviet officers were also disgusted by the quality of the Iraqi military and Saddam's strategy and tactics, but they were nonetheless impressed by U.S. capabilities (Lambeth, 1992; Defense Intelligence Agency, 1991).

Among the primary lessons learned from the war and the study of what may come next are the following (see also Hillestad, Huber, and Weiner (1992) and Department of Defense (1992)):

- Planning for offensive operations is important and will be increasingly important in the future.
- Political-military factors may dominate in the future (e.g., legitimacy of effort, U.S. cohesion, alliance structure and cohesion, base access, reaction time, etc.). (Actually, they have *always* dominated, but this is a lesson that must routinely be relearned.)
- Given air supremacy and the right circumstances (e.g., armored warfare in Saudi Arabia rather than jungle warfare in Vietnam), air power is extremely lethal and can be the decisive force even though it cannot by itself win wars.
- Large-scale armored offensives are probably infeasible against a sophisticated enemy with air supremacy; the attacker's tanks would quickly become an endangered species.
- Indirect fire is becoming increasingly important, as is the lethality of direct-fire attack helicopters.
- Maneuver, dispersal, and infantry operations will be increasingly critical because adversaries learning from Desert Storm will seek to avoid giving the U.S. the plush targets available in that war.
- The nonlinear battlefield and long-range precision strike are real and effective.
- Nuclear, chemical and biological weapons will greatly complicate planning: we must expect future adversaries, having studied Desert Storm, to credibly threaten use of such weapons in the future.

To repeat a central conclusion, our future adversaries will also have learned lessons from the Gulf War. If they pursue aggression, they are very likely (Bennett, Cecchine, Fox, and Gardiner, 1993) to try to avoid the circumstances in which the awesome capability of U.S. air power can be readily employed. This could mean a much greater emphasis on speed (completing their operations before the U.S. is able to react), denying us air bases through both political and military means, fomenting internal revolutions simultaneous with their invasions, and credibly threatening the use of mass-destruction weapons.

RECAPITULATION

Let us now summarize this rather long chapter, which has reviewed classic methods and contrasted them with current needs.

Changes of Context and Emphasis

The first reality, of course, is that context has changed drastically since the end of the Cold War, and with it the emphases that should be placed on different topics. The current threat of global war is almost nonexistent, the Russian threat to Western Europe has vanished, and although the Russian threat to Eastern Europe and the Baltic states will continue to exist, an invasion of Poland or Czechoslovakia does not seem plausible in the near term. The CIS is a shell, the Russian Federation may itself disintegrate, and the Russian Army is no longer cohesive. Continued conflicts in Eastern Europe and the former Soviet Union are quite likely, but they will not be analogous to the Cold War's image of war. Looking to the more distant future, the next major threat/rival is perhaps as likely to be China or Japan as Russia.

The U.S. role in the world has also changed. We are no longer dominant in Europe, and Europe's future is *largely* up to the Europeans. The U.S. is the world's strongest military power, with no other nation even close behind and no clear-cut enemies nor well-defined threats. At the same time, given its values and interests, there is little that the U.S. can do militarily except in a coalitional context with world-level legitimacy.

The U.S. role is therefore very much up in the air. It remains to be seen whether the U.S. will turn inward, attempt to become a benevolent policeman, be the leader of ad hoc coalitions attempting to bring about an approximation of the "New World Order," or something else.

Nonetheless, despite uncertainty, it is possible to draw some contrasts between classic defense planning and the planning suitable for the post–Cold War era. Table 2.2 summarizes differences in emphasis. The number of bullets in each row indicates impressionistically the relative emphasis of the various topics. We see a shift away from great-power deterrence, strategic equivalence, and the like toward more emphasis on regional issues and regional environment shaping. We *may* see more coalitional intervention in the Third World, but that remains to be seen and may depend on events in Somalia and the former Yugoslavia over the first months of 1993. We also see much more explicit concern about realistic war objectives, minimizing casualties, grassroots support for military action, and—above all, perhaps—fiscal restraint.

Table 2.3 summarizes the relevance (or nonrelevance) of classic paradigms and assumptions, some of which we mentioned only briefly in the preceding text. As is evident, much has changed, fundamentally.

Finally, Table 2.4 summarizes major implications for defense *analysis* as a result of the classic paradigms having become obsolete.

Especially important, it seems to us, are four conclusions:

- *Classic requirements-based planning is bankrupt.* Requirements-based planning, with its movement from allegedly representative planning scenarios (in the context of one-and-a-half wars or global war) and threat ground-force buildups to quantitative force requirements, is no longer credible. While the most likely *large* potential threats can be identified, there are enormous uncertainties about future *effective* force levels and scenario details.
- *Environment shaping is central to force structure planning.* In the past, the stressing contingencies could serve to rationalize force structure. Today, however, deterring or responding to contingencies is only one military function, and not the one most criti-

cal in dictating overall force levels,[37] unless one assumes future threats that are more capable than currently seems justifiable.

- *Lesser cases are no longer lesser included, if they ever were.* The concept that worst-case planning suffices, because lesser-included cases can be dealt with when they arise is now demonstrably false: the requirements for dealing with the various contingencies likely to arise are very different, even to the extent of the nature of the forces required (e.g., armored divisions vs. mobile light infantry).
- *Defense analysis needs new generic "campaigns."* The traditional methods of higher-level defense analysis, focused on aggregated measures of ground-force capability vs. time, are now quite inadequate as a representation of the relevant military issues. To assess how much is enough, analysts will need to look at various operational concepts in some detail, reflecting well such new developments as lethal air power, lethal indirect fire, mobile and lethal infantry, and information dominance. And, since particular scenarios are not likely enough to be a good basis for planning, we will need *generic campaigns* to help us assure coherence in planning (more on this in Chapter Three). Some of these campaigns need to contemplate prolonged wars, requirements for control of lines of communication and urban areas, and other unpleasant subjects that affect thinking about force requirements and mixes.
- Campaign plans must deal with likely chemical, nuclear, or biological threats, and possibly with actual use.

The DoD has already reacted to many of these needs with its Regional Strategy and use of multiple DPG scenarios (Powell (1992), Cheney (1992), and, for unclassified discussion of planning scenarios, Gellman (1992) and Rathbun (1992)), but there is much more to be done. The problem of planning under massive uncertainty must be rethought, because the algorithm developed in the McNamara era is no longer appropriate.

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[37]This theme was developed by Paul K. Davis, Steven Drezner, and Richard Hillestad in an unpublished January 1991 issue paper for policymakers, "Beyond the Great Transition." See also Winnefeld, Pollack, et al. (1992).

Table 2.2

Contrast Between Old and New Emphases

Subject	Cold War	Post–Cold War
Great-power deterrence	●●●	●
Strategic equivalence (nuclear and conventional)	●●●	●
Nuclear crisis stability	●●	●
Great-power arms-race stability	●●●	
Alliance solidarity	●●●	●●
Superpower arms control	●●●	●
Regional stability	●●●	●●
Nuclear proliferation and counterproliferation	●	●●●
Ballistic-missile, chemical, and biological-weapon proliferation	●	●●●
Regional-power deterrence	●	●●●
Regional military stability and related environment shaping	●	●●●
Regional arms control		●●
Discouraging new military great powers and related environment shaping		●●
Coalitional intervention in support of New World Order concepts		●●● (?)
Crisis management and rapid decisionmaking	●●	●●●
Reactions to or preemption of terrorists and third countries with weapons of mass destruction	●	●●●
Ability quickly to create and operate militarily with ad hoc coalitions	●	●●●
Realistic war objectives	●	●●●
Concern about casualties	●	●●●
Concern about achieving national consensus before action	●	●●●
Fiscal restraint	●●	●●●

Table 2.3

Classic Paradigms and Current Relevance or Irrelevance

Classic Assumption	Currently Relevant?
Monolithic global Soviet threat	No
2-1/2 or 1-1/2 war strategies	No longer very useful
Stable alliance patterns	No
Precise Defense Planning Guidance scenarios with few excursions	DPG scenarios appropriate only as analytic baselines not to be confused as best estimates
U.S. and allies always on strategic defense	Only in sense of not being aggressive
Forward linear defense as operational strategy	Only sometimes
Air power as source of significant but uncertain firepower	Given air supremacy, air power can in some cases be dominant factor: blunting armored offensives, preventing concentration
Separate ground, air, and naval balances; focus on ground	Need "campaign perspective" emphasizing jointness
Conventional defense in Western Europe likely to fail; nuclear use likely	Defense of Western Europe is no longer the issue.
Short intense armored warfare	One case among many
Global war	No longer plausible without long buildup by new major power
Most forces in place, readily mobilized (Europe), or readily mobilized and deployed	Future adversaries will try to impede U.S. deployments; they may also act quickly and may use unconventional forces, chemical weapons, other mass-destruction weapons, and internal revolutions

Table 2.4

Changes Needed in Analytic Approach

Classic Analytic Approach	Needed for New Era
Most plans and analysis anchored on DPG-like scenarios	Always needed, but especially now: multiscenario analysis and a "scenario space" perspective (Chapter Three)
Simplistic timelines and scenarios	Realistically complex timelines (e.g., with partial alerts and mobilizations, and with come-from-behind cases)
Requirements-analysis approach using equivalent divisions vs. time curves, wargaming and simulation	Capabilities analysis with measures of robustness; multiscenario analysis, whether with gaming or simulation; marginal analysis
Bizarre mix of best-case and worst-case assumptions	Facing up to massive uncertainty rather than converging on "blessed" scenarios
Blessed TPFDLs as key elements	TPFDLs as major output of analysis, not assumption of analysis
Piston models, FLOT battles, simple maneuver	Nonlinear operations on an effective network
Air power as mere firepower and participant in separate war	Air power as critical element of joint operations; significant for lethality and countermaneuver implications
Quantitative focus on equipment	Corrections for fighting quality of enemies and allies
Bureaucratic fights over simultaneity assumptions	Much less important [Note: this judgment has proven wrong as of June 1993]
Very conservative "scoring" underestimating technology and command and control	Realistic evaluation of contributions from command and control and other "technical" factors

Chapter Three

PLANNING UNDER UNCERTAINTY: MULTISCENARIO ANALYSIS AND ADAPTIVE PLANNING

THE CHALLENGE

We have seen that the preeminent challenge in the post–Cold War period is to think anew about coping with uncertainty—planning security strategies, force programs, and the possible use of military instruments under a wide range of circumstances. No longer can defense planning proceed as though only a handful of conflict scenarios are so likely or dominant in dictating military requirements that other possibilities can be ignored.

How might planners meet this daunting challenge? Ultimately, the nature of the challenge is one of extreme complexity—an endless number of ways to package and employ forces in an endless set of possible situations. In tackling complex problems, a useful place to begin is by developing a reasonably precise structure characterizing the nature and boundaries of uncertainty. This can help us break the problem into manageable parts, suggest ways to cope with uncertainty, and facilitate communication. The same methods are useful for strategic, programmatic, and operations planning.

DEFINITIONS

Scenario Space

With this motivation, let us introduce the concept of a *scenario space,* by which we mean the collection (or "space") of present and future contexts where U.S. military instruments can be used to implement

national policies. A particular scenario, if defined in detail, becomes a "point" in scenario space.

To make this less abstract, consider how we might characterize a particular scenario. What characteristics define it? These become the "dimensions" of our scenario space. While scenarios may have hundreds or even thousands of characteristics affecting outcome, we simplify the description by grouping these characteristics into a few broad categories, as shown in Table 3.1.[1] This decomposition reflects specialized interests of various players in the defense planning community. Security strategists focus on the first few dimensions, force programmers on the third and sixth, and military scientists and analysts on the fifth and sixth. Planning should, of course, consider multiple dimensions and recognize interconnectedness. If it does not, it may be seriously wrongheaded. For example, it is common to vary force levels in analysis while holding operational strategy constant—even though changing strategy would often be far more fruitful than buying and maintaining additional forces. As another example, the key variable may actually be the relative qualitative fighting effectiveness of the adversaries. Such was surely the case in the Falklands War.

Envelopes of Capability

Suppose next we consider the operation of a particular U.S. force (e.g., the Base Force described in Powell (1992)) in scenario space. Within this space, there are many points where that force can achieve our objectives. There are many others where that force will not succeed. There are still other points at which the force may or may not succeed, depending on contextual details such as weather, the intelligence of enemy tactical commanders, and good fortune.[2] Let us define the boundaries between success, plausible success, and

[1]For earlier expressions of this concept, see Davis and Winnefeld (1983) and Davis (1985, 1988a). Colleague Patrick Allen has helped us in expanding the definitions and is using them to define scenario data bases and documentation.

[2]In principle, outcomes of conflict may be deterministic, but in practice they depend on a great many unknown factors that should be considered to be random variables. Except in the artificial world of simulation models or in instances in which one antagonist is enormously more powerful than the other, we cannot expect to specify scenarios in enough detail to predetermine the outcome.

Table 3.1

Dimensions of Scenario Space

- *Political-military setting* (e.g., origins of conflict, coalitions, broad interests and objectives, significant political events, and potential for crises elsewhere)
- *Operational political, economic, and military objectives and strategies* (e.g., deterring expansion of crisis, use of economic embargoes for compellence, and military defense of a nation based on a particular set of defense lines)
- *Instruments: forces and support assets, economic instruments, and political instruments* (arguably, informational instruments should also be called out separately)
- *Geography and other environmental factors* (e.g., weather and terrain)
- The *processes and relationships* that represent military operations mathematically (e.g., the "laws of war" for attrition in close-combat or operational-level movement of ground forces when under sporadic attack by air forces)
- Data and parameters for *real-world capabilities of weapon systems and force components* (e.g., effective firepower of the ground units, taking into account equipment, training, morale, and other factors; or armored vehicle kills per sortie expected by particular aircraft against classes of targets)

failure as *envelopes* in scenario space. *Our objective in planning is to "expand the envelope" of the success region.*[3]

We are borrowing this terminology from aircraft designers, who worry about how to describe and extend the performance of the aircraft they are designing. One standard depiction is a plot (as in Figure 3.1) with altitude vs. mach number (speed as a multiple of sound speed). The curve represents the aircraft's performance envelope. At

[3]Another objective is clarifying for decisionmakers which regions of scenario space cannot reasonably be covered.

a given mach number, the aircraft can operate up to a specific altitude, but not beyond: it will only fly "inside the envelope." Note that with rare exceptions such as the U-2, an aircraft designer would never think to build an aircraft to perform only at a single point (i.e., at a single altitude and mach number). Nor would he have the luxury of *assuming* that an aircraft that could fly supersonically at high altitude (point A in the figure) could also fly close to mach 1 at low altitude (point B). Neither point is a lesser-included case of the other, and various factors are limiting in different parts of the envelope (e.g., propulsion, lift, or aerodynamic stability). Further, designers must worry about "balance": improvements of supersonic performance may reduce subsonic performance, and vice versa, so explicit tradeoffs are necessary. Contingency planning should be similarly concerned more with regions and envelopes of capability, and less with points (i.e., with particular scenarios).

Because of the multidimensional nature of scenario space, we cannot depict it visually except—by analogy with the aircraft problem—

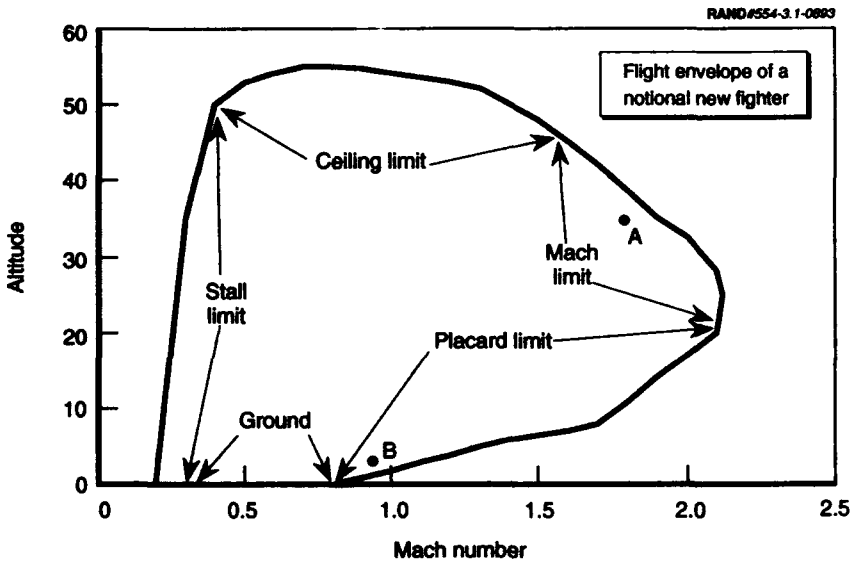

Figure 3.1—An Envelope Depiction of Aircraft Capability

by showing particular *slices* through the space, as illustrated in Figure 3.2. This particular slice considers hypothetical capabilities for dealing with a new invasion of Kuwait and Saudi Arabia late in the decade. The slice focuses on the threat's force level and the timeliness of U.S. response as key variables of interest. We see here *notional* envelopes indicating regions in which the U.S. should be able to defend and defeat the attacker (light), slashed regions in which doing so would be dicey (i.e., dependent on contextual details such as the capability of regional allies and luck) and in which success might be only partial, and dark regions in which success would be most unlikely. At the point denoted "a particular scenario" the figure indicates that the U.S. should expect success if it has about ten days of deployment time before D-day and a threat of about seven equivalent divisions (EDs). If the threat were larger by several divisions, the

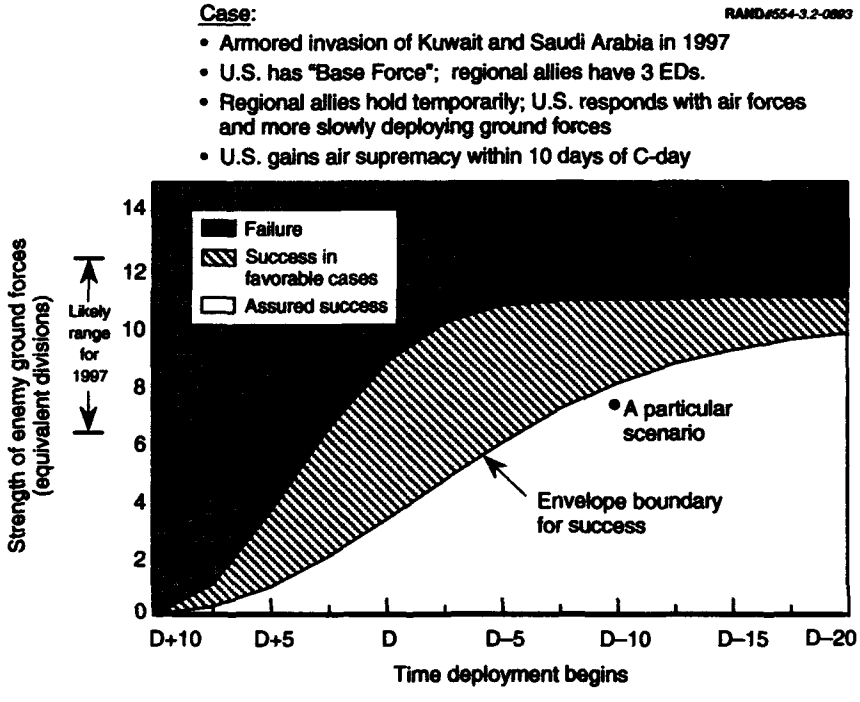

Figure 3.2—Notional Capability Envelope in Portion of Scenario Space

outcome would be uncertain for the same number of days of deployment time.[4]

Depictions such as Figure 3.2 make prominent in statements of requirements that one does not *know* when D-day will be, whether the enemy will in fact attack, or when the President will order various actions. Figure 3.2 encourages us to plan for an entire *region* of scenario space, and to recognize that a strategy good for one region may not work for another.

This is not abstract philosophizing, but rather a matter of pragmatically facing up to uncertainty. Suppose, for example, that we had the capability to deal well even with large attacking forces so long as we could deploy our own forces two weeks before D-day, planning to employ them in a particular way. What would this tell us about our ability to cope with a scenario in which a much smaller force attacked with only 48 hours of warning and the U.S. took two more days to begin deploying, on D+2? It might be nice if we could merely say "Well, in that case we could do nothing." If defending Kuwait and Saudi Arabia is a vital national interest, however, then we *must* be able to "do something," even in the "bad" parts of scenario space.

What we could do would, of course, be different than in a standard planning scenario. The possibilities include: (a) helping regional states build up a more substantial initial-defense capability, (b) being prepared to mount massive strategic bombing of Iraq immediately upon any invasion occurring (primarily as a deterrent measure), and (c) being prepared to mount a multimonth campaign to recapture the conquered portions of Kuwait and Saudi Arabia from staging posts on the Red Sea, Mediterranean, and southern Persian Gulf. These strategies would require different combat and support forces.

The scenario-space approach, then, highlights the necessity of being prepared to work in a broad range of circumstances, not mere variants of the illustrative planning scenario, but variants requiring fundamentally different approaches.

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[4]If the figure extended to several months of deployment time for U.S. forces, it would show the success envelope extending upward to much higher threat levels.

COPING WITH THE COMPLEXITY OF SCENARIO SPACE

Tasks and Functions

Most simply, there are two tasks in coping with complexity: (a) *understanding* the problem space in all its dimensions (the role here of analysis), and (b) *developing capabilities* to cope with the diverse challenges. For both tasks we need to distinguish among issues relevant to the functions of strategic planning, program planning, and operations planning.

Approaches

Since each of the scenario-space dimensions is actually an aggregation of many characteristics, as suggested by the items in parentheses in Table 3.1, the dimensionality of scenario space and the combinatorics of dealing with it are stupendous. With only 30 scenario variables, each with three potential values, the number of potential combinations would be about 200 trillion. This is the "curse of dimensionality" referred to by analysts. Exhausting all the possibilities is out of the question, but the dimensionality is real. How, then, can we cope with it?

There are many ways to go about these tasks. These include:

- Focusing strictly on capabilities and requiring certain static and quasi-static *balances of power* (as measured, primarily, by bean counts of divisions, air wings, capital ships, and so on),[5] then planning to "cope when the time comes," with whatever contingencies arise.
- The *illustrative scenarios* approach.
- *Adaptive planning* around illustrative scenarios.

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[5]Great Britain used this approach in the 19th century by establishing the goal of maintaining a navy as large as the sum of the navies that might reasonably be aligned against her. Similarly, some have proposed thinking about military stability in the former Soviet Union and Eastern Europe in terms of requiring national armies to be limited so that plausible coalitions would not have enough strength for aggression given assumed advantages of the defending nation.

- A more *comprehensive scenario-space and adaptive-planning approach.*

Table 3.2 suggests simply the circumstances under which the different approaches are most suitable. For example (line 3 of the table's body), given great uncertainties in scenario and plenty of time to develop responses when real threats arise, one can argue that balance-of-power methods are adequate at the highest levels and that military commanders will be able to develop plans as necessary when the time comes. However, if one has both large uncertainties and the potential for having only short response times (e.g., because potential adversaries sit astride the world's oil supplies), then (last line of the table) more concrete planning is necessary. Given large enough uncertainties, we argue that it is dangerous to rely too heavily on illustrative scenarios, even with an overlay of adaptation around them. Our thesis is that the U.S. has taken the illustrative-scenarios approach for several decades, that the approach has become much more sophisticated and adaptive in the last two years (especially in connection with operations planning), and it is now possible and desirable to go on to a more nearly comprehensive approach that would build heavily on the recent developments.

PLANNING BASED ON ILLUSTRATIVE SCENARIOS

Background

Illustrative scenarios have been used for decades by strategic and programmatic planners, as discussed in Chapter Two and Appendix A, and even by operations planners. In the 1960s and 1970s the scenarios typically dealt with Europe, Korea, and Southeast Asia. In the early 1980s, they dealt with Europe, Southwest Asia, and Korea. For example, in mobility planning the DoD considered four major contingencies (see Davis (1982) and Rathbun (1992): (a) a regional conflict in the Persian Gulf with an indigenous force attempting to take control of the oil fields; (b) an invasion of Iran by the Soviet Union; (c) a NATO–Warsaw Pact conflict; and (d) a global war beginning with invasion of Iran and spreading to Europe. In the mid-1980s the emphasis was on a single global counter-Soviet scenario beginning in Southwest Asia and spreading, after a delay, to Europe and elsewhere.

Table 3.2

Appropriateness of Approach to Dealing with Complexity

		Methodology			
Scenario Uncertainty	Available Response Time	Balances of Power	Illustrative Scenarios	Illustrative Scenarios plus Adaptive Plans	Comprehensive Scenario-space Approach
Low	Long	Fair	Good	Good	Good
Low	Short	Poor	Fair	Good	Good
High	Long	Good	Good	Good	Good
High	**Short**	**Poor**	**Poor**	**Poor**	**Good**

There are several variants of the illustrative-scenario approach, all of which have been used at one time or another: (a) planning for one or a very few supposedly "representative" cases and hoping that they turn out to have been indeed representative; (b) focusing on one or a very few worse-than-expected scenarios and assuming that actual scenarios will be lesser-included cases (the classic method used since the McNamara era and described in Chapter Two); or (c) extending the first approach to a fairly large number of scenarios, some of them large and stressful, others smaller but stressful in different ways (the so-called multiple-scenario approach.

Current Use of Multiple Scenarios

Current defense planning is of the multiple-scenario variety. Reportedly, the draft version of the 1992 Defense Planning Guidance (DPG) contained seven scenarios (Washington Post, 1992 and Rathbun, 1992):[6]

- Major regional contingency in the Persian Gulf (vs. Iraq) (MRC-East)

[6]There is less detail available on the final DPG scenarios, but they were characterized as follows in a recent study (RAND, 1992): MRC-East, MRC-West, MRC-Europe, concurrent contingencies, LRC, LRC-near, and reconstitution.

- Major regional contingency on the Korean peninsula (vs. North Korea) (MRC-West)
- Two concurrent major regional contingencies beginning sequentially (in Southwest Asia vs. Iraq and then in Korea to defend against invasion by the North) (see Figure 3.3)
- Major regional contingency involving defense of Lithuania against Russia
- Regional contingency in Southeast Asia (coup attempt in the Philippines)
- Regional contingency in the Western Hemisphere (coup attempt in Panama)

The DPG specifies, for each of these: gross political-military setting, allied and threat force levels, and timelines for warning, mobilization, deployment, and so on. The DPG does not, however, provide anything like full scenario details.[7] These scenarios are used primarily for program planning, but they also affect operations planning in that the Joint Staff takes them into account in developing its guidance to CINCs (the Joint Strategic Capabilities Plan or JSCP).

Introducing multiple scenarios or, more importantly, introducing the diversity of major and lesser non-Soviet scenarios indicated above, was a step forward, because the scenarios differ in character and planning for all of them will necessarily produce a broad range of capabilities. Nonetheless, if it were merely a matter of having the seven illustrative scenarios rather than, say, the several at the beginning of the 1980s, it would to a considerable extent amount to having merely "more of the same" rather than something truly new. There may be seven scenarios, but for a given theater there is only one major regional contingency, which hardly does justice to the notion of dealing with uncertainty. There are an infinite variety of ways that a future war involving Iraq (and perhaps Iran) could unfold with Kuwait and Saudi Arabia as targets.

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[7]An example of fuller scenario definition of the sort used for political-military wargames and studies is Blechman, Smyrl and Utgoff (1987), developed for the Director of Net Assessment.

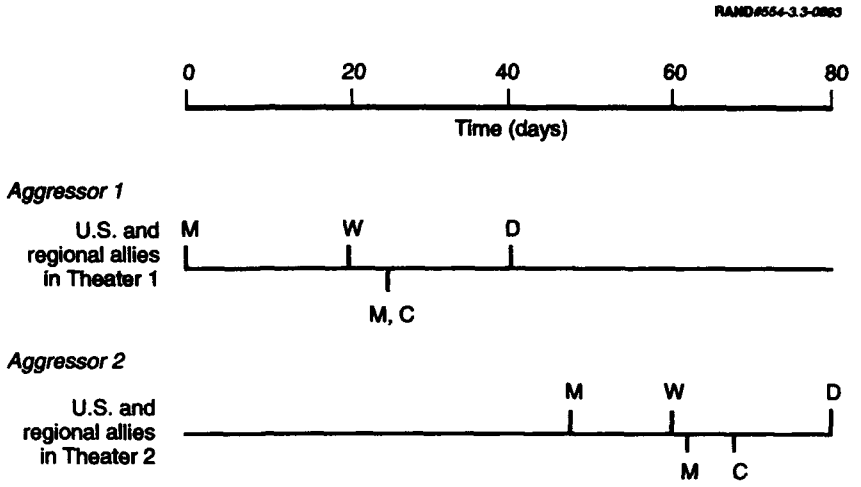

Figure 3.3—Schematic Planning Scenario for Concurrent Major Regional Contingencies

MILITARY ADAPTIVE PLANNING GUIDED BY ILLUSTRATIVE SCENARIOS

Objectives

In fact, there has been more substantial progress as part of a general strategic move toward the objective of *adaptive planning* discussed in the *National Military Strategy* (Powell, 1992, pp. 12–13):

> To meet our unilateral and alliance responsibilities, the United States needs a diverse spectrum of military options. A smaller total force requires flexibility in planning, training, and employment . . .
>
> Warning time, or available response time, is far more likely to be exploited by key decisionmakers if they have a menu of options from which to choose. These options need to be pre-planned and gauged to a wide range of crises. This fundamental change to our military strategy is reflected in an adaptive planning process, through which planners develop multiple options keyed to specific crises.

There is more to all this than mere declaratory statements. Joint Staff guidance to CINCs is now explicit about the need to prepare not only for various standard scenarios (not necessarily limited to those specified in the DPG), but also for variants. The guidance emphasizes that standard peacetime planning assumptions (e.g., actionable warning time, the President's decisions regarding partial mobilization, and the behavior of allies) are unlikely to prove correct at the time of actual military operations; it admonishes the CINCs to plan accordingly. Although such guidance seems straightforward now, it is a distinct departure from longstanding practices.[8]

Response Options

The Chairman's objectives include both military flexibility and the ability to provide politically useful options to the President. As a start in this regard, the Joint Staff provides three generic alternative response options (Figure 3.4):

- Flexible deterrent options (FDOs)
- Deploy decisive force
- Counterattack

Flexible deterrent options are small discriminate actions designed to demonstrate concern and resolve and, in most cases, to lay the groundwork for subsequent actions if they should prove necessary. If they do not appear to be effective, then the President can order a deploy-decisive-force response. The intention might still be deterrence, especially if opponent intentions were still ambiguous, but the deploy-decisive-force response would also prepare us for war. As discussed below, there can be numerous variations within a given detailed operations plan.

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[8]As one colonel acquainted with operations planning and exercises in the mid-to-late 1980s stated in regard to exercises, "The planners didn't want us to screw around with any of the planning assumptions. Those were cast in brass." We still heard similar comments in discussions with mid-level planners on CINC staffs in 1991 and 1992, but changes are occurring.

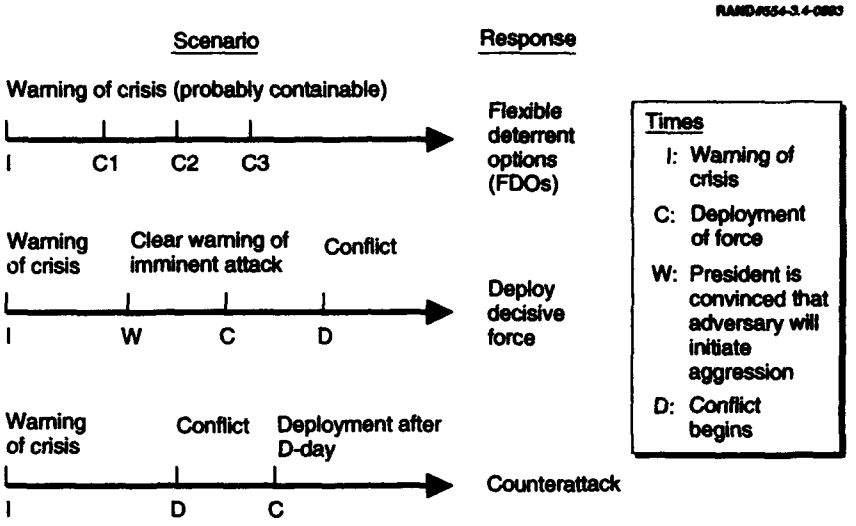

Figure 3.4—Response Options for Different Situations

It could happen instead that the U.S. reaction *follows* D-day, the so-called no-warning-attack case.[9] This response is called, simply, "counterattack," because from the outset the objective is to fight and counter the opponent's prior moves. This does not mean that counteroffensive operations would begin immediately. Saddam Hussein's August 2, 1990, invasion was a no-warning attack and the U.S. exercised the "counterattack response" (with initial deployments of a sort that would also strengthen deterrence of attack on Saudi Arabia), but offensive operations against Iraq did not begin for five months.

[9]This is unfortunate terminology, because strategic warning almost always exists before attacks begin. Unfortunately, the warnings are often ambiguous, and the nations may not have a clear sense of their stakes and options until an actual invasion clarifies the situation. See Betts (1982), Knorr and Morgan (1983), Davis (1988a,b), and Davis and Arquilla (1991a).

Flexible Deterrent Options

As mentioned above, FDOs are designed to express interest and concern on the part of the United States when crisis arises. Deploying a carrier battle group to a crisis scene would be a traditional reaction to crisis that might now be called an FDO, but there could be many other possible military FDOs involving air forces, infantry, afloat prepositioning equipment, and so on. The precise size and shape of such FDOs will vary, but they are considered to be "small."

The Joint Staff saw that the FDO concept should not be restricted to military instruments.[10] Indeed, the first instruments that policymakers usually think of using in a crisis are political or economic. Initially, the Joint Staff more or less ignored the nonmilitary instruments because of not having purview over them. Recognizing a vacuum, however, the Joint Staff now asks CINCs to identify as part of their planning the kinds of nonmilitary actions that could be useful as "FDOs," so that in times of crisis suggestions for such actions could be made quickly to appropriate agencies. Figure 3.5 illustrates generically some of the many FDOs that might be considered.[11] We observe that although FDOs are currently limited to "small" military actions, some of the FDOs postulated for the economic realm would not be considered small by those involved in international economic dealings. Over time, one might expect that large military operations such as blockades would come to be considered FDOs.[12]

Decisive Force and Related Controversy

The deploy-decisive-force response option is carefully named. General Powell has emphasized (Powell, 1992) the importance of bring-

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[10]Expanding the FDO concept to include the other instruments was one of the first recommendations of this study to the Joint Staff in 1990 and 1991.

[11]The political FDOs may seem more like preparing for war than FDOs, but if these activities are discussed in the public media they could reinforce the credibility of other FDOs.

[12]Institutionalizing options for nonmilitary and limited-military actions was one of NATO's quiet and unappreciated accomplishments in the 1980s. These came about in response to the recognition, especially by U.S. planners, that the transition to war might not be as clean as standard scenarios assumed.

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Political	Diplomatic
Consult congressional leaders Increase public awareness	Send demarches Reduce diplomatic ties Meet with foreign leaders Evacuate unofficial Americans
Military	**Economic**
Increase reconnaissance collection Intensify training Put forces on alert Exercise prepositioned equipment Deploy small units	Discontinue assistance programs Freeze assets Enact trade sanctions Restrict corporate transactions

Figure 3.5—Generic Examples of Possible Flexible Deterrent Options

ing to bear decisive force if military operations are likely. Doing so can greatly reduce casualties, risks, war duration, and the cost of war. Although there could be circumstances in which the decisive-force doctrine might not be feasible or appropriate, it is usually a good principle and most of its apparent defects are more semantic than real. The principal exception is that there are instances in which rapid military response to crisis, with intermediate-sized forces exposed to greater dangers than would be desirable, is preferable to not reacting until such time as decisive forces can be brought to bear. Basically, there is a tradeoff calculation to be made. Rapid response often has a higher likelihood of heading off crisis altogether, but if deterrence fails, those forces might suffer serious losses unless they are mobile enough to avoid them, given available appropriate air cover. As discussed in Davis and Arquilla (1991b), deploying forces *into Kuwait* might have been necessary to deter Saddam Hussein in 1990; smallish FDOs deployed into Saudi Arabia might very well not have been adequate.

In our own thinking about the deployment of small forces for deterrent purposes, we have found it useful to consider the following criteria:

Criteria for Deploying Forces for Deterrence in Risky Situations

- The deployment should assure the perception of a U.S. commitment to fight if necessary. It should do nothing to undercut the credibility of that commitment. The appearance of timidity should be avoided as a high priority.[13]
- If forces will be in harm's way, they should be made as survivable as possible (e.g., by assuring strong air cover to ground forces and ground-force protection to air fields, granting permissive rules of engagement, and using mobile forces such as airmobile infantry or armored cavalry). In addition, we should visibly prepare and announce capability and intention to respond immediately against both armies and the aggressor's homeland (e.g., with long-range bombers and cruise missiles) in the event of attacks on our forces.
- If there is a small but significant chance that deterrence will fail, even the initial deployment should be substantial enough to assure early reinforcement and support for the forces at risk, even if allies argue for smaller deployments.
- If there is a non-small chance that deterrence will fail, the deployment should be of decisive proportions from the outset, i.e., one designed to fight and win, even if allies argue for smaller deployments.
- Where this does not contradict the first principle, we should consider relying significantly for deterrence on deployment of air forces with substantial strike capability rather than installing

[13]This admonition applies to all aspects of crisis action and stems from history's sad experiences of failed deterrence. Ironic here is the letter from Neville Chamberlain to Hitler on August 23, 1939. It began: "It has been alleged that if H.M. Government had made their position more clear in 1914, the great catastrophe would have been avoided." Having established British concerns about making its will and intentions clear, the letter emphasized Britain's determination and resolve to honor the guarantee to Poland. However, Chamberlain then undercut everything by expressing optimism about finding a peaceful solution through negotiations. See Jablonski (1991, p. 15) for a summary of this affair. The larger point here is that it is exceedingly easy for would-be deterrers to undercut their objectives with even slightly mixed signals, largely because the aggressive adversary will tend to see and hear only what reinforces his priors (e.g., his belief that the would-be deterrer lacks the will to fight over the particular issues at stake). Military "signals" without teeth are dangerous for precisely this reason. So it was in July 1990 (Davis and Arquilla, 1991b).

"tripwire ground forces." The credibility of U.S. air strikes is now much higher than before the Gulf War and continuing Iraqi crisis.

The first item is important because there is a distinct danger in crisis that deployments will be counterproductive: if they are small or timid (e.g., such as to keep forces out of harm's way), they *may* undercut our credibility rather than enhance it. Merely deploying unarmed combat aircraft, performing reconnaissance missions, or conducting naval surface-group exercises (all of which might be considered major signals by some) can readily be perceived by our opponent and allies as timid. Similarly, deploying a brigade of infantry into Saudi Arabia late in July 1990 might have merely reinforced Saddam's belief that the U.S. would not fight over Kuwait. In our view, then, small-scale FDOs are useful to show that the U.S. is watching and interested, but they may be dangerous in the most serious crises (Davis and Arquilla, 1991a).

Given that credibility-enhancing deployments sometimes require putting forces at risk, points two through five are very important. The history of "tripwire" forces is not a happy one in general, despite their apparent success in Central Europe, Korea, and elsewhere. While we lack empirical research on this, we believe it to be the case that allies may grumble about what they see as "larger-than-necessary forces," but they seldom switch sides or withhold critical support. Similarly, while there can be substantial congressional and public criticism of major deployments in crisis (i.e., criticism much greater than would attend deploying small forces and putting them at risk), it is our impression that the President has the upper hand here and can usually win in the court of public opinion: the concept of avoiding halfway measures, minimizing risks to Americans, and bringing to bear overwhelming force is probably more familiar and intuitive to the average citizen than the average negotiator. General Powell's success in enforcing his principles goes beyond his having a sympathetic ear on these matters with presidents. At the same time, we believe there should be more explicit planning for military options short of deploying decisive force (points two, three, and five).

Returning now to the DoD's current strategic principles rather than our own views, Figure 3.6 depicts schematically two ways force deployments could unfold under a deploy-decisive-force response. We

see that the initial response consists of FDOs, but at some point the President directs the deploy-decisive-force response, after which the buildup of capability is much more rapid. Deterrence may succeed at some point, at which time the deployment could be stopped and even reversed, although perhaps over a period of months. But if the crisis did not resolve itself peacefully, the buildup would continue. If war began before the deployment of the "initial response force" was complete, defense would be more risky; U.S. casualties might be higher, or it might be necessary to trade space for time. Eventually, the full decisive force would be deployed, at which time counter-offensive operations could begin with good expectations of success.

It is worth noting that what constitutes "decisive force" is highly dependent on the circumstances: the theater, the threat, objectives, and the detailed nature of the scenario. It is possible that air forces and regional allies could be decisive in some instances, in which case deployment of decisive force might take only weeks. In other instances the decisive force might include a corps or two of U.S. Army forces and a Marine Amphibious Force, as well as many wings of Air Force and naval tactical air forces.

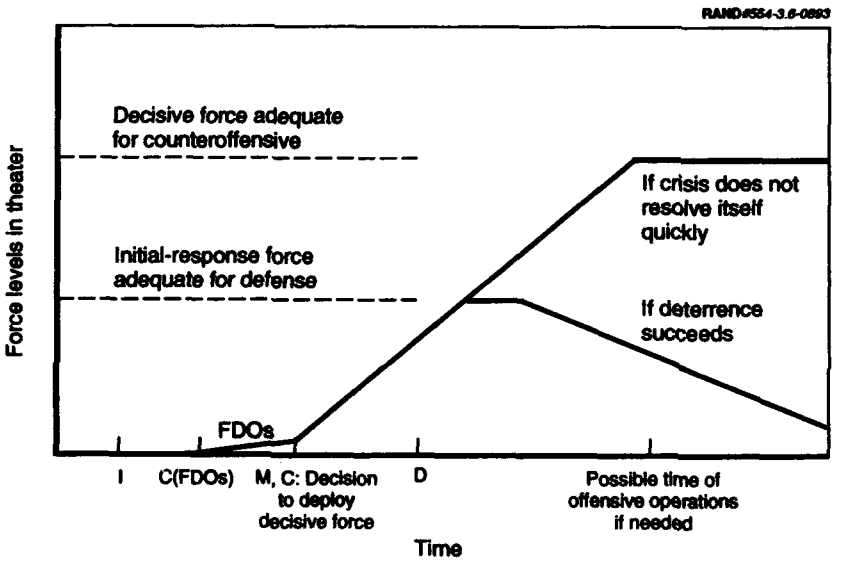

Figure 3.6—Two Possible Time Histories for Large-Scale Crises

Risks During Response Period

As planners have become more sensitive to scenario uncertainties such as not knowing whether deterrence will work or when D-day might be, it has become useful to highlight risk periods as shown in Figure 3.7.[14] The topmost curve shows the buildup of enemy ground forces measured in equivalent divisions.[15] The lowest solid curve shows the combined level of ground forces for regional allies plus deploying U.S. forces. The dashed lines show "requirements" for relatively confident defense and relatively confident counter-offensive operations. These requirement lines would depend on complex judgments accounting for: the likely theater- and scenario-specific potential effects of an air campaign and for the direct effects

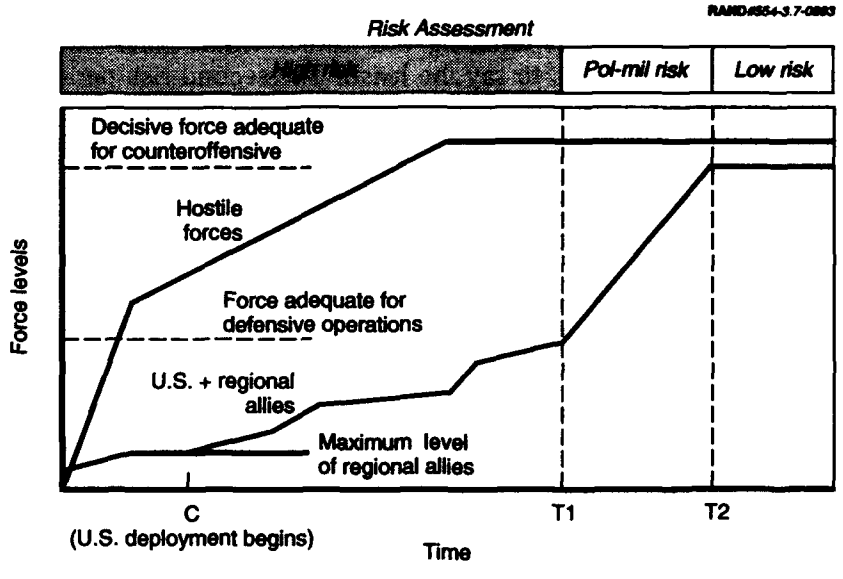

Figure 3.7—Risk Periods During Deployment of Decisive Force

[14]This display was motivated by a somewhat different one used by Col Clifford Krieger of National Defense University.

[15]Other displays are needed to show the buildup of air forces and naval forces, but the main points of our discussion do not require them here.

of air power on enemy ground forces and maneuver; the qualitative capabilities of enemy and friendly forces; and such matters as enemy ballistic missile threats, chemical weapons, air defenses, anti–tactical ballistic missile defenses, and so on. Thus, there is no simple relationship between the force curve and the dashed requirements line (i.e., nothing like a 3:1, 1.5:1, or 1:1 rule in terms of divisions or equipment). Ultimately, Figure 3.7 is a "picture" to guide discussion. One can look at it, for example, and "see" the value of early deployments, prepositioning to speed deployments, and having forces already in the region.

There are qualitative differences between the kinds of risks involved in the early and later periods, before the initial-response force has reached theater, and before the decisive-force deployment is complete. The riskiness of the first period is real and substantial. Had Saddam Hussein continued to attack into Saudi Arabia rather than stopping at the border, entering U.S. forces would have had an extremely difficult time, to say the least. The second risk period is different in kind. One could argue that there is no hurry in completing deployment of the decisive force, because the counteroffensive phase could be delayed until a time of our choosing. That would indeed be true in some scenarios, but there are risks in slow buildups. These include:

- Potential coalitional difficulties (e.g., how long would the Syrians, Egyptians, British, French, and Saudis have cooperated in the crisis with Saddam?)
- Providing more time for the adversary to cause coalitional problems (including through use of chemical or biological weapons), build defenses, perfect special weapons or tactics, etc.
- Reduced flexibility with respect to choosing the time of a counteroffensive to correspond to good weather.
- Increased opportunities for the adversary to sack or destroy any captured territory and torture allied citizens.
- Permitting continual "simple attrition" from sporadic or limited attacks to grind up a significant percentage of our forces.

To be sure, we cannot afford to buy forces and strategic mobility adequate to move decisive force anywhere in the world instanta-

neously, but there are good reasons to be able to do so quickly rather than at leisure.[16]

The principal point to be made here is that the DoD now reasons in these terms, confronting the problems of uncertainty to a much greater extent than previously.

Flexibility Within Operations Plans

Until recently, operations plans were notoriously monolithic and fine-tuned. One meddled with their details only at great risk. Increasingly, however, the Joint Staff and CINCs have been moving toward operations plans with built-in flexibilities. This comes from anticipating some of the "What ifs?" and developing appropriate hedges. The basic approach is largely one of trying to build as much preplanned flexibility as possible into the operations plans for a major contingency.[17] Figure 3.8 summarizes some of the types of variations the authors might expect the CINC planners to consider. Some may be thought of as providing for scheduled *branches* (e.g., at the time we deploy into the theater, what defense line should we set up?). Others are unscheduled adaptations of a sort that could occur at almost any time (e.g., the decision to fall back to another line or to change the day's air tasking orders).[18]

Emphasizing Flexibility When Building Programs

Although there are some notable exceptions, the program-building part of defense planning is not yet as sophisticated about dealing

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[16]This was a central issue in the recent congressionally mandated study of possible mixes between active and reserve forces (RAND, 1992), because it implied that it was both important and feasible to shorten trainup periods.

[17]A useful metaphor stressed to us by the J-5's COL Harry Rothmann is one of football. Just as football teams develop an extensive playbook, which contains many plays with built-in variants that can be triggered before the ball is snapped by "audibles," or thereafter as part of quarterback or running back option plays, so also should modern operations plans have the flexibility of built-in branches.

[18]The distinction between scheduled and unscheduled adaptations is crucial in theories of planning under uncertainty. For related discussion, including how such matters can be dealt with in computerized wargames with decision models representing commanders with adaptive strategies, see Davis (1989b, 1990).

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Discrete flexibilities	Continuous flexibilities
• Alternative objectives and concepts of operations • Alternate defense lines • Choice of initial defense line • Initial air tasking order • An opposed amphibious operation • An opposed air-assault operation • Assignment of sector responsibilities among coalition forces • Sending or not sending units with commitments to other theaters also • Various levels of mobilization	• When to fall back to another line • Daily air tasking orders • Whether to execute tactical options (e.g., assaults) • Where to employ area-defense infantry • Ad hoc arrangements for sealift • Ad hoc arrangements for en-route refueling in friendly nations • Moderate reordering of TPFDL • Diverting deploying units to another theater if a new crisis arises at the same time

Figure 3.8—Types of Flexibility Within Operations Plans

with uncertainty.[19] By introducing multiple scenarios it recognizes that there are different regions that could have their own wars (rather than being part of a global war) and that there could be "major" or "lesser" conflicts in each, but it has only begun to deal with the uncertainties about each such war.[20] In reality, for each broad type of major regional conflict (e.g., a reinvasion of Kuwait and Saudi Arabia by Iraq and/or Iran) there is an infinite number of scenarios. The notion that developing forces and plans for one of them necessarily prepares us to fight for others is wrong. Nonetheless, most studies

[19]DoD's strategic-mobility studies have typically included substantial sensitivity analysis regarding access to bases and canals, simultaneity of crises, and some other key variables. The most recent of these was the Mobility Requirements Study conducted by the Joint Staff. See Blair (1992) and Rathbun (1992).

[20]One example of such an effort, which predates the new initiatives, was NATO's development of premobilization preparation measures that could be triggered under circumstances of ambiguous warning. This was based on U.S. proposals and many years of effort.

done to support the Planning, Programming, and Budgeting System (PPBS) tend to follow DPG scenarios closely in measuring the relative goodness of program options.

Is the problem one of picking the "right" DPG scenarios? Is there perhaps a useful worse-than-expected case on which to focus? The answer is no, because the nature of military operations, and the capabilities required for them, varies drastically depending on scenario details for a given region. For example, reinforcing in anticipation of war is fundamentally different from coming from behind and starting with forced entry.

The response to this observation is usually of the form, "Well, if the situation were all *that* bad (e.g., having to fight our way in), we just wouldn't go to war!" That form of response is especially common when discussing portions of scenario space that involve unpleasant and prolonged, "dirty" wars, which all of us hope the U.S. avoids. The no-more-Vietnams attitude is strong in all of us. At the same time, it is the job of the DoD to prepare for the full range of conflicts in which the U.S. may find itself, and history is sobering about the degree to which we can predict what wars will arise. Another feature of the scenario-space approach, then, is to force planners to think about classes of scenario that they would rather ignore. We may not want to get into such conflicts and we may be pessimistic about prospects should we do so anyway, but the requirement to prepare for everything plausible, rather than everything currently thought to be likely or acceptable, is real and important. Using Figure 3.2 again, then, we argue that the U.S. should develop capabilities to deal as well as is reasonable with "bad" cases, such as those involving substantial enemy force levels and tardy U.S. response.

LIMITATIONS OF THE CURRENT APPROACH

Operations Planning

Despite the impressive innovations, we believe there remain a number of limitations to the current approach. It is difficult to judge these matters without access to classified plans and studies, but we think it likely that operations planning still suffers from:

- Too little emphasis on *speed* of planning and response for major contingencies,[21] including, importantly, speed in the political-military discussions among critical policymakers.
- Too much reliance on preplanned options or, more to the point, too little emphasis on ability to develop and execute new options quickly.[22]
- A limited number of response options (albeit with a good deal more flexibility than before).
- Only modest efforts to deal adequately with some of the most difficult but plausible crisis scenarios (e.g., scenarios in which we have minimal reaction time and our regional allies are ineffective militarily). See Table 3.3 for other examples adapted from Winnefeld (1992, p. 36).

Table 3.3

Illustrative "Difficult" Cases

	Visible Scenarios	Less-Visible Scenarios	Least-Visible Scenarios
Near term: 0–2 years The domain of contingency planning	North Korean invasion of South Korea[a]	Indo-Pakistani conflict	War between states of former Soviet Union
Midterm: 3–10 years The domain of resource planning	Iran/Iraq aggression in Gulf	Overthrow of Saudi monarchy	Civil war in major Latin American state
Long term: 10+ years The domain of acquisition planning	Russia reemerges as aggressor	Chinese aggression in Southeast Asia	Japan or Germany as military rival

[a]Equally likely, in our view, are scenarios that begin with disintegration of North Korea's communist government, civil war within the North, and the spreading of that conflict.

[21]In this regard, the experience of Desert Shield should have been sobering.

[22]To be sure, rapid-planning ability would depend heavily on having built plans previously and would quite possibly build from previous "baseline" plans (especially for mobilization and deployment), but the changes might be substantial rather than marginal. Furthermore, one would need *many* baseline plans, not one or two, if the intention was that the actual plan should closely resemble one of the baselines.

- Inadequate development of quick-reaction responses going beyond shows of force, but falling short of deploying a go-to-war force (i.e., options between FDOs and deploy decisive force).
- Too little emphasis on *testing* rapid-reaction capabilities for nonstandard scenarios.

Strategic and Programmatic Planning

In the world of programming and strategy development, we see additional problems. These include:

- Continued dependence on "requirements analysis" in a period of history in which that approach is simply not adequate. The postulated illustrative scenarios may be reasonable point cases, but they are not a good basis for decisions. Resource allocation decisions should not be based on accepting these scenarios as establishing sound "requirements," because they are simply too arbitrary. Instead, the U.S. should be more interested in measuring the leverage of additional expenditures in pushing back the envelope of capability in scenario space, a kind of marginal analysis.
- Strong pressures throughout the DoD for analysis organizations to focus on the illustrative planning scenarios, not merely as common yardsticks and baselines, but to the exclusion of more far-reaching analysis.[23]
- Analytic methods based on standard scenarios that place too little value on active-force support units providing specialized capabilities that can be critical in fast-breaking crises (see, e.g., Winnefeld and Shlapak, 1990) and peaceful uses of the military.

We shall touch upon some of these later in the study.

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[23]A recent RAND study is a case in point here. The Congress required the DoD to have an FFRDC conduct an analysis of alternative active-reserve mixes, primarily for the Army. The DoD's preference was that the analysis accept the illustrative planning scenarios as fixed, and avoid going beyond them. Ultimately, the study examined a number of alternative scenarios and concluded that likely war outcomes and the significance of reserve policies were highly sensitive to scenario assumptions (RAND, 1992).

A PROPOSED APPROACH TO MULTISCENARIO ANALYSIS AND ADAPTIVE PLANNING

Objectives

Let us now sketch elements of a new approach. Figure 3.9 suggests what we have in mind and how it can be considered to represent a further evolution of capability planning. In the 1980s, planning revolved around a single global scenario; in the early 1990s it has been enriched to consider illustrative planning scenarios for each of many regions; now, however, we propose to confront the uncertainties involved in considering conflict in any one of those regions—replacing the single illustrative planning scenario by a scenario-space approach. This is consistent with our larger objectives, which include (a) increasing flexibility and speed of operations planning in actual large-scale crises, and (b) changing strategic and programmatic analysis to encourage more emphasis on cross-scenario flexibility and robustness of capability.

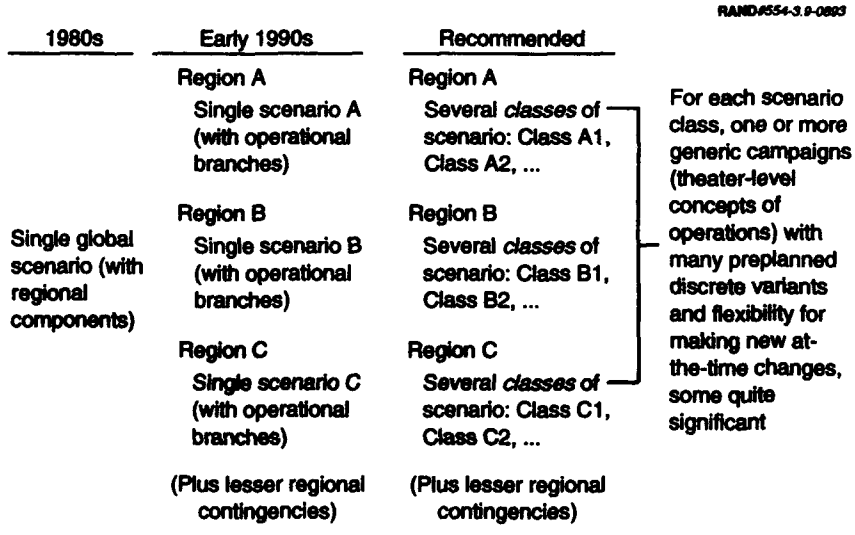

Figure 3.9—Proposed Evolution of Approach for Operations Planning

Decomposition of Problem

We said earlier that there are two tasks in dealing with complexity: understanding the problem space, and planning. Let us deal first with the challenge of understanding potential contingency requirements in scenario space. We shall need to define some terminology. Let "broad regional scenario" mean something like "invasion of Kuwait and Saudi Arabia by Iraq" or "invasion of South Korea by North Korea." Current DoD planning has multiple scenarios only in the sense that it considers a number of broad regional scenarios (e.g., one for Southwest Asia, one for Korea, and so on). For each such broad scenario it specifies precisely one "illustrative planning scenario" as discussed earlier (i.e., it specifies warning time, mobilization time, and so on)—even though there is an infinite number of detailed scenarios consistent with the broad regional scenario. By contrast, our approach is as follows (Figure 3.9):

- For each broad regional scenario, break the scenario space down into a relatively small number (perhaps a half-dozen or fewer) of *scenario classes*. Scenarios within a given class differ from each other in degree and detail, while scenarios in different classes envision different types of war with different challenges for U.S. and allied capabilities. In particular, they involve different *generic concepts of operations* (e.g., a concept of operations such as rapid deployment into friendly territory, followed by positional defense, followed months later by a maneuver-warfare counteroffensive; a second generic concept might involve forced entry to control bases, large-scale deployment into semihostile territory involving urban areas, joining up with regional allied forces, defending ill-defined lines in mobile warfare, and going into counteroffensive operations).
- For each scenario class, develop one or several *analytical baseline scenarios* in moderate detail. A given analytical baseline scenario might look very much like a well-defined version of one of the current illustrative planning scenarios. However, there would be more of them (e.g., 2–4 for each scenario class for each

broad regional scenario) and many of them would definitely not be "best estimate" scenarios.[24]

- For each analytical baseline, conduct a large number of "What ifs?" and sensitivities, *exploring*—in greater or lesser detail—the most relevant dimensions of scenario space indicated in Table 3.1. Which dimensions are most relevant will vary from one broad regional scenario to another, from one scenario class to another, and from one analytical baseline to another. That is, one does not have to do *all* the conceivable sensitivities around all the different baselines. It does, however, require developing a plan of analysis to identify the likely key factors, and then iterating with the benefit of insights gained from wargames and simulations.

By understanding the breakdown into scenario classes and analytical baseline cases, and by exploring the scenario regions around each:

- Operations planners should be able to develop several alternative generic campaign plans, each of which has branches and built-in adaptations, *and* to identify the kinds of special capabilities or tactics that would be most important as hedges.
- Program planners should be able to assess the relative value of alternative candidates for the defense program, including candidates that are valuable "only" as hedges against circumstances quite different from standard DPG scenarios.
- Strategic planners should be able to better appreciate the potential implications of their decisions, in peacetime, crisis, and war. They should also be better able to assess the significance of proposed foreign-policy initiatives involving bases, multination exercises, prepositioning, and military assistance.

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[24]The basic concept here is mathematical: if one is going to conduct sensitivity analyses, to address "What if?" questions, then one must recognize that the answers can vary dramatically depending on where one chooses the baseline. Amphibious and vertical-envelopment forces, for example, have little or no value in many reasonable baseline cases, but they could be critical factors in others; similarly, the difference in value between radar- and electro-optical sensors in surveillance systems and weapons might be small in some cases (good weather) and enormous in others.

If these concepts are correct, they define a mechanism for dealing with the curse of dimensionality that has always frustrated planners who have attempted to consider multiple scenarios. Are they correct? Is it indeed feasible to find the scenario classes, baseline cases, and key sensitivities? The reality here is that the concepts represent hypotheses, not certainties. They are informed by our experience, but they are not rigorously provable. Further, working through the process indicated (i.e., identifying the "right" scenario classes, baselines, and sensitivities) is unquestionably a matter of intelligence, skill, and "art."

Nonetheless, there is a basis for our optimism about the approach. In particular:

- We have had good experience with past examples of multiscenario analysis, despite the curse of dimensionality.[25]
- We know from experience with "open" and "unconstrained" political-military and military wargaming that one can learn a great deal about the game board and the key factors—more than one might expect, considering the dimensionality of scenario space.[26]
- We know from other experience in strategic planning (in the more general sense of the word that includes corporate and political activities) that the high payoff for before-the-fact planning is very often preparing oneself for rapid actions during

[25]Appendix B describes an effort applying similar methods in a major Central Region balance study in the mid-1980s. It involved on the order of 1000 computerized wargames *after* a lengthy period of thinking and interactive wargaming for purposes of "exploration" to identify the key variables and baseline cases. The results of the study were unusual and significant. They affected subsequent influential analysis in support of conventional-forces-in-Europe (CFE) arms control. Recent RAND work for the Army is exploiting multiscenario analysis methods to examine alternatives for Army force structure in the years ahead. There again, despite massive uncertainty, it has proven possible to do convergent reasoning (unpublished work by colleagues James Quinlivan and Fred Frostic).

[26]There are various testimonies in support of these assertions. As indicated in the museum of the Naval War College, Admiral Nimitz stated that with the exception of kamikaze tactics, all the events (i.e., possible strategies, tactics and "moves") of the Pacific campaign in World War II were anticipated in wargames. The details of what transpired were, of course, not predictable, but the *elements* of the actual scenario were. Many of those who did preoffensive gaming of Desert Storm feel similarly.

crisis, including actions for which there could not reasonably have been detailed development of courses of action.

- We know from experience in studies that concern about uncertainties (i.e., with the true complexity of scenario space) need not paralyze us. As we shall discuss later, there are techniques, such as fault-tree methods, that can balance complexity and practicality in developing strategies for *actions*.
- New analytic techniques are now emerging to improve our ability to "explore" the problem space systematically.[27]

Even if our optimism proves excessive, we believe the reader will agree that even moderate steps in the direction we propose would greatly affect the nature of planning. For planners of all types to recognize that a future war in Southwest Asia could take several distinctly different forms with correspondingly different demands on U.S. capabilities would surely be an improvement over planners merely postulating a replay of 1990.

Elaboration on Scenario Classes and Generic Campaigns

A key element in our approach is the concept of scenario classes and the linked concept of *generic campaigns* (i.e., generic theater-level concepts of operations). While we are skeptical about any reasonable number of detailed scenarios "covering the space," it is plausible that a relatively few campaign concepts would prove applicable to a large portion of the most relevant scenario space—one generic campaign for each member of a large scenario class. To be sure, the degree of success achieved, the costs of success, and the time required for success would all vary significantly with scenario details.

[27]In addition to discussion in Davis (1988a), see the highly ambitious discussion in Bankes (1992b), which led to an ongoing CIA-sponsored exploratory-analysis project that is showing great potential. In a prototype analysis using the NEXT machine and a network of Sun workstations, Bankes and colleagues are able to explore and display the characteristics of a substantial scenario space. Many millions of model runs may be made routinely in such work, and visualization methods make it possible to examine results and infer conclusions about sensitivities and dependencies. Although still in its infancy, such work, coupled with the capacity for uncertainty analysis of something like the RAND Strategy Assessment System (RSAS) or a successor has revolutionary potential.

However, from the viewpoint of military planning, roughly the same campaign plan would apply in many instances (Figure 3.10).

This is not the place to describe campaign plans in detail, but Figures 3.11 and 3.12 illustrate at an aggregate and nonquantitative level what we have in mind.[28] Figure 3.11 represents, *very roughly*, the type of nominal campaign plan used currently in a number of studies being conducted at RAND and in the government when looking at major regional contingencies of the sort that might arise in the Persian Gulf (see, e.g., Bowie, Frostic, et al. (1993) and RAND (1992)). This plan emphasizes rapid deployment of air power to blunt an armored invasion and support defending allies, with some light infantry deploying early as well to protect the well-stocked entry bases assumed to exist. Over time, more ground forces arrive (Marines exploiting maritime prepositioning squadrons (MPS), Army forces

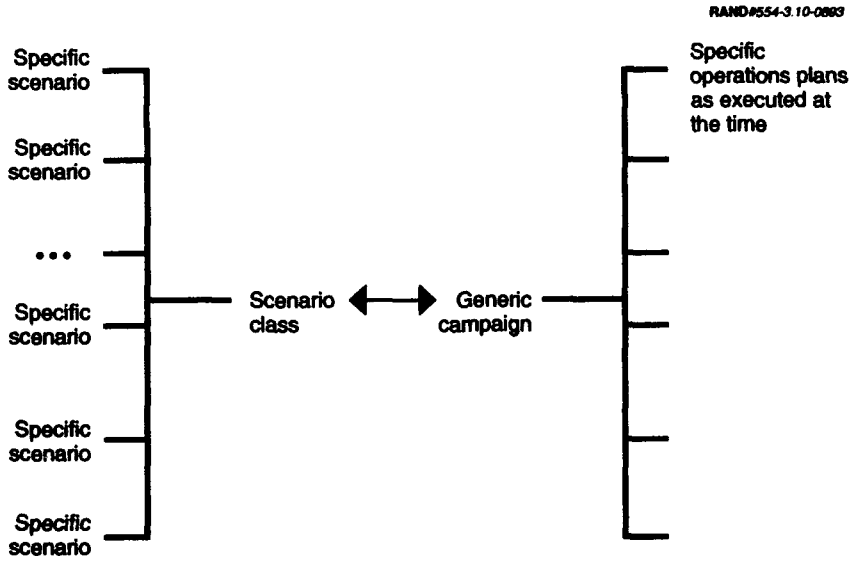

Figure 3.10—Relating Scenario Classes and Generic Campaigns

[28]Fleshing out the concepts described here requires estimating force requirements for each component of the campaigns. This is easier than one might expect, because the requirements are often dictated more by doctrine than by details of scenario.

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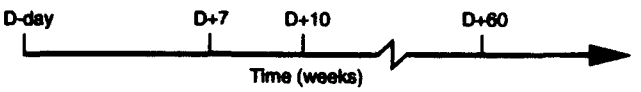
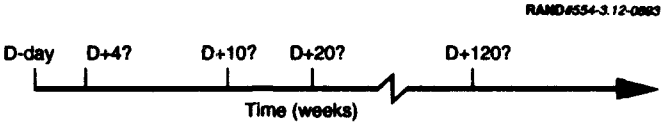


Regional allies (target of aggression)	Conduct holding operations to protect key areas	(Continue as capable)		
Strategic bombers	Blunt armored attacks	Attack air bases, C3I and armies		
Special Operations forces	Secure key points; provide recon.; etc.	Conduct diverse support operations		
Ground-based air defenses	Defend key air and sea ports	Plus defend important areas	Plus defend theater air space	
Light infantry	Defend key air and sea ports	Defend other key points		
Air defense aircraft	Defend key areas	Attack enemy air forces		
Surveillance and battle-management aircraft	Support defensive operations	Support counter-air operations		
Fighter aircraft for air-to-ground missions		Conduct SEAD operations	Attack LOCs and ground forces	
Fighters and bombers for "strategic" bombing		Attack air bases and C3I		
Armored forces (including MPS Marines)			Defend key areas (MPS)	Conduct counteroffensive (Army and Marines)
Support forces	Support defensive operations			Support counteroffensive

Figure 3.11—An Illustrative Generic Campaign (Kuwait Revisited)



Regional allies (target of aggression)	Do best possible to survive coup de main tactics and internal revolution	Retake and secure key areas. Reestablish control. Reestablish armed forces, C3I, etc.		Participate in counter-offensive
Strategic bombers	Attack enemy's homeland for compellence?			
Special Operations forces	Support and conduct assault operations			Conduct diverse support operations
Ground-based air defenses		Defend key air and sea ports	Plus defend important areas	Plus defend theater air space
Light infantry	Assault and capture, then defend, key air and sea ports Protect allied leadership, C3I, etc.	Defend other key points Retake and secure some key urban areas. Reestablish friendly government.		Conduct infantry operations in difficult terrain
Air defense aircraft (Air Force and Navy)	Provide air cover for deploying forces	Attack enemy air forces		
Surveillance and battle-management aircraft	Support defensive operations	Support counter-air operations		
Fighter aircraft for air-to-ground missions	Support operations as feasible from available bases and carriers	SEAD Attack LOCs and ground forces where possible		
Fighters and bombers for "strategic" bombing	Support operations as feasible from available bases and carriers			
Armored forces (Army and MPS Marines with significant armor)		Defend key areas (MPS units)		Conduct counter-offensive (primarily Army)
Support forces	Support defensive operations			Support counter-offensive

Figure 3.12—A Nonstandard Campaign (Coming from Behind)

using fast sealift, and so on). Eventually, the force is large enough to conduct an armored counteroffensive if necessary. Ultimately, the campaign plan depends heavily on the extraordinary lethality of air power (and, perhaps, early deployable ground-force firepower in the form of MLRS with the ATACMs system). Because of this, it also depends sensitively on the ability to obtain bases quickly, to support operations requiring specialized jet fuel and munitions, and to suppress enemy air defenses.

Figure 3.12 is fundamentally different in character and describes crudely a come-from-behind campaign in which U.S. forces must conduct early assault operations to seize and protect the entry bases for air forces and infantry. In the extreme, such an approach would be infeasible and a third campaign plan would be necessary, one envisioning an assault after months of preparation, perhaps staging from such remote areas as the southwestern side of Saudi Arabia on the Red Sea and Israel.

How many generic campaigns would be needed to "cover the space" adequately? We simply do not know at this stage, but we are confident that the approach is a good one. The more serious problem is the tendency for planners (and analysts) to stop with the canonical campaign (e.g., Desert Storm revisited and the campaign plan of Figure 3.11). This is *surely* true in strategic and programmatic contexts; it may or may not be as true in operations planning, but it has been in the past and we suspect it still is.

Planning and Describing Capabilities and Goals

Having talked about decomposition of scenario space for the purpose of understanding it through analysis, let us now turn to planning functions. While exploring scenario space is an exercise in *divergent thinking*, planning requires *convergent thinking and reductionism* leading to concrete and understandable goals and related strategies for achieving them.

We mentioned earlier that it is necessary in planning to take "slices" of scenario space and that knowing which slices to take is the essence of good analysis. Which slices are appropriate depend on one's function (e.g., operations planning vs. program development;

or, within the latter, development of strategic mobility vs. development of improved weapon systems or maneuver forces).

This is not the place to *do* such analysis, but we need examples nonetheless. With that in mind, Figure 3.13 uses a discretized depiction of the scenario-space and coverage-envelope concepts to illustrate notionally how one might express requirements, albeit for only portions of scenario space. All of Figure 3.13 deals with capabilities desired for 1997 with respect to being able to defend oil interests in the Persian Gulf against an invasion of Kuwait and Saudi Arabia by Iraq. Instead of concocting a single DPG scenario, such as one that might describe the box at the top right (more than a week of pre-D-day deployment and a significant defense effort by regional states), this illustrative "requirement" states that the military should prepare for *all* of the scenario classes shown, although capabilities would necessarily depend heavily, in some cases, on context-dependent details and "luck." The light boxes are those in which the requirement is for a robust capability—i.e., one minimally dependent on

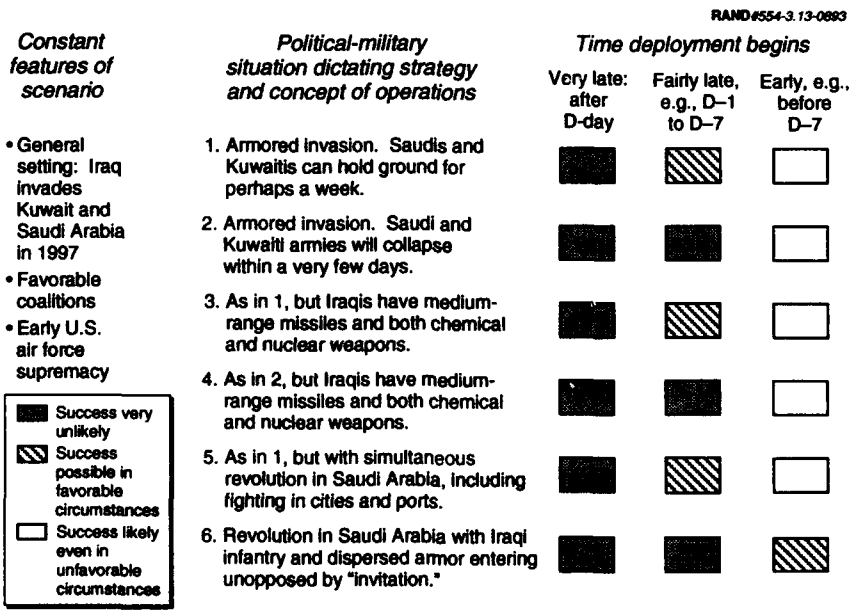


Figure 3.13—Illustrative Requirements for the Defense Program

such special factors. The slashed boxes are those in which we would be highly dependent on them. It might very well be that when the contingencies arose, we would be unable to react militarily, at least not for a period of months. The dark boxes are those that are "too difficult." They are not worthy objectives for planning. This doesn't mean that we should ignore the cases they represent. Instead, it means that we would have to deal with those cases when they arose—perhaps with a multiyear war requiring us to establish a foothold in the general region, build up an enormous infrastructure, and reconquer lost territory in a campaign over large distances (e.g., staged from the Red Sea and southeastern Arabian peninsula).

The form of the "requirements statement" is quite different from the more traditional one of providing a particular buildup rate over time to compensate for an assumed rate of threat buildup. This statement says to the Joint Chiefs of Staff and the services:

- Our objective is to have the capability to deal with all the contingencies in Figure 3.13, since protecting Kuwait and Saudi Arabia is a vital U.S. interest. However, recognizing that some scenarios would make a successful initial defense impossible without a major in-region presence, and would instead require a buildup over many months followed by a campaign to recover the peninsula, the emphasis for planning our quick-reaction forces should be to achieve high or marginal confidence levels in being able to defend in the cases indicated. This defines the "envelope" of required capability for this region and threat.
- It may be that we will need qualitatively different concepts of operations and significantly different force mixes to deal with the entire set of contingencies indicated. The defense program should be developed accordingly. Near-term operations planning should also consider this range of cases.

Presumably, the result of pursuing such objectives would include developing generic campaigns analogous to those in Figures 3.11 and 3.12.

Another aspect of defense planning would include demonstrating, through figures such as Figure 3.14, the value in "pushing back the envelope" of various programmatic and foreign-policy initiatives.

One could show stoplights changing color in depictions such as Figure 3.13, or one could use more continuous representations such as in Figure 3.14, which illustrates notionally how prepositioning of equipment can improve our coverage of scenario space.

Evaluating Alternative Strategies and Related Programmatic Issues

One constant theme in contingency analysis is the problem of timely response from many thousands of miles away. While traditional programmatic planning has postulated scenarios favorable enough to make plausible strategic mobility forces adequate to do the job, there are scenarios where no such solutions are feasible. In these instances, changing strategy is especially appropriate. One such alternative strategy is to place more emphasis on deterring attack through the credible threat of immediate strategic conventional bombing of the aggressor's homeland and of large-scale conventional precision-strike attacks on the aggressor's military forces. Such a strategy is distinctly feasible in the 1990s because the U.S. is

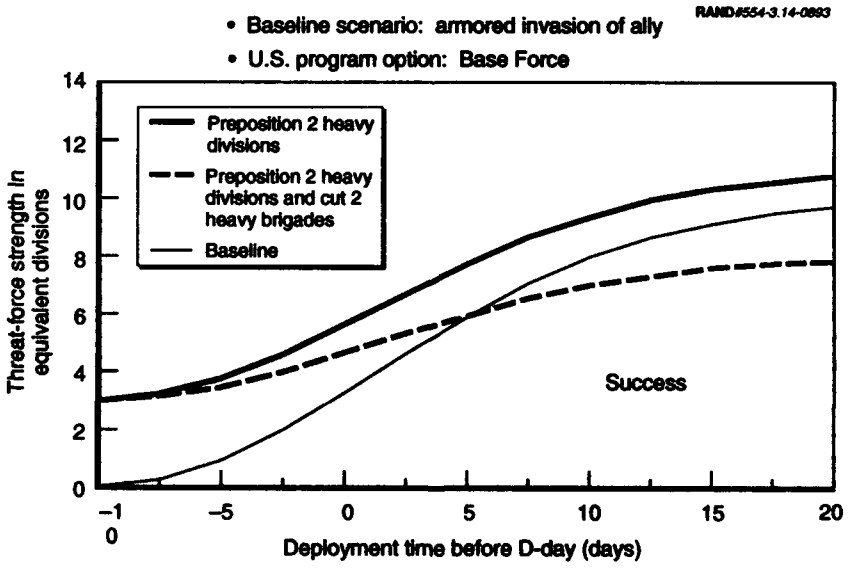


Figure 3.14—Value of Prepositioning in Pushing Back the Envelope

likely to achieve air supremacy quickly in the most plausible MRCs and because modern air forces have unprecedented effectiveness by virtue of advances in acquisition, weapon accuracy, and weapon lethality. RAND has conducted related analyses for the Air Force and has demonstrated the unique and powerful potential of B-2s and B-1s (if suitably equipped) in such roles (Buchan, Frelinger, and Herbert, 1992). In particular, these systems could be used on D-day even if regional bases had not yet been obtained and secured. Such force-employment strategies are included in Figure 3.11 as part of the generic concept of operations.[29]

Importantly, the value of the strategic bombers for this role would not show up in an ordinary analysis based on the DPG's illustrative scenarios. However, in some scenarios the bombers would be critical. While this may seem straightforward, even obvious, we observe that the Air Force, DoD, and RAND were severely criticized in 1991 and 1992 for claiming to see substantial and unique value for the B-2 bomber. To many skeptics, the shift of emphasis to conventional missions was a mere ploy to save an expensive and troubled program. Analytically and strategically, however, RAND had concluded in 1990 and 1991 that the "right way" to look at the B-2 was in fact for its unique value in conventional force projection. RAND further concluded, after extensive analysis, that the marginal cost of acquiring more rather than fewer B-2s was far less than the public debate suggested. Our point here, however, has to do less with the B-2 per se than with how the controversy over the B-2 demonstrated how unusual it is to measure programs against something other than standard scenarios.[30]

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[29]For a complementary view emphasizing naval-force options in some detail, see Perrin (1991), a study done by the Center for Naval Analyses. That study concludes that a carrier-based A-X attack aircraft could, in most cases, deliver as much or more weapons payload per dollar as the B-2 over the course of a campaign. Perrin concludes that the B-2 and A-X are complementary, because long-range bombers have the advantage of strategic agility, while tactical aircraft have, over the course of a campaign, the advantage of high *sustained* sortie rates and some capability for air-to-air missions (an example of tactical agility). One would not expect it to be feasible to maintain high sortie rates of strategic aircraft operating from the United States.

[30]The last straw in the 1991 debate about the B-2 was the bomber's failure to pass a particular "stealth test." As of January 1993, the Air Force was reporting that correcting the cross-section problem could be accomplished with confidence and reasonable cost, but that conclusion was too late. The Air Force has also been studying potential

In a similar vein, we believe it requires no particular imagination to recognize the possibility of scenarios in which substantial assault capability might be needed early and in which substantial light forces might be needed for securing airfields, cities, and LOCs. Analysis along these lines might (or might not) change attitudes regarding the cost effectiveness of the Osprey long-range VSTOL aircraft and other assault-related capabilities.

It also requires no great imagination to envision contingencies lasting many months rather than weeks, with the U.S. finding itself defending bases, cities, and LOCs with light forces. This would present a substantial problem, because the U.S. is not programming currently to provide an adequate base, in either active or reserve forces, for maintaining such a deployment.[31]

Identifying Appropriate Slices in Scenario Space

There are no detailed rules for deciding which of the scenario-space variables to focus upon when developing requirements or conducting tradeoff analyses. However, we will mention here briefly a strategic planning technique that has proven useful in a number of prior RAND studies (Davis, 1988a,b) and in recent work on the likely reaction of potential adversaries to lessons learned from the Gulf War.[32]

Let us assume that we have already done a great deal of problem exploration with gaming and simulation. We are now wise experts with respect to a particular class of threats in a particular region (e.g., with respect to a North Korean invasion of South Korea or a new Iraqi invasion of Kuwait and Saudi Arabia). How do we "converge"

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weapons upgrades to the B-1B that would make it possible for it to perform at least some of the long-range conventional missions.

[31]The weakness of the Base Force with respect to light forces emerged in a recent study of active-reserve-mix issues (RAND, 1992) and an even more recent study, not yet concluded, of post–Cold War requirements for Army force structure. We thank colleagues Fred Frostic, James Quinlivan, and Kenneth Watman for discussion of these points.

[32]Backward-planning techniques akin to the fault-tree techniques discussed in the text have been used in a continuing "future of warfare project" sponsored by the Director of Net Assessment (Bennett, Cecchine, Fox, and Gardiner, 1993).

on a good problem description that lends itself well to programmatic and operational activities?

Rather than discuss current problems, some of them sensitive, suppose we use as an analogy the Central Region problem as it existed in the period 1985–1989. Standard methods emphasized a scenario that would allow several weeks of mobilization by both the Warsaw Pact and NATO. Conventional wisdom was that this was the principal threat, because the Pact would regard a shorter-mobilization attack to be too risky. Upon assessing the problem militarily, however, without the mind-set constraint of having to choose one or another scenario, RAND concluded that NATO had qualitatively different problems in dealing with scenarios of extremely short and long mobilization, problems requiring very different types of solution. One depiction of this situation was that of Figure 3.15—a "fault tree" showing ways in which NATO could lose a war with the Pact. This tree reflected insights from perhaps a thousand simulations (see Appendix B), but it was deliberately a simplified depiction intended to focus attention on a few particularly serious problems. One such problem (second branch) was NATO's extreme vulnerability to a short-mobilization attack from a Pact posture that included ready front-line forces and a small remobilization increase in the number of high-readiness reserve forces in the Soviet Union. Our gaming indicated that this was the scenario that could most plausibly permit the Soviets to achieve the quick breakthroughs and theater-level encirclements they emphasized in doctrine. Solving this problem would require partial readiness measures to be adopted in response to ambiguous warning, early plans to maneuver U.S. ground forces to weak sectors in Northern Germany, a few more divisions of operational reserves, or an operational strategy permitting NATO to give some ground initially to avoid early breakthroughs. By contrast, the problems in long-mobilization scenarios were sustainability and the hypothetical (and greatly exaggerated) early arrival of Soviet second and third strategic echelon forces. Here we addressed the problem by challenging the threat itself (it was to us incredible that "Cat 3" reserves would be effective in assault operations after only a month of training), recommending greater sustainability, and recommending arms control measures that would constrain readiness of Pact reserve forces (Davis, 1988b). Figure 3.16 shows an objectives-based "success tree" from that study. It, like Figure 3.15, served the pur-

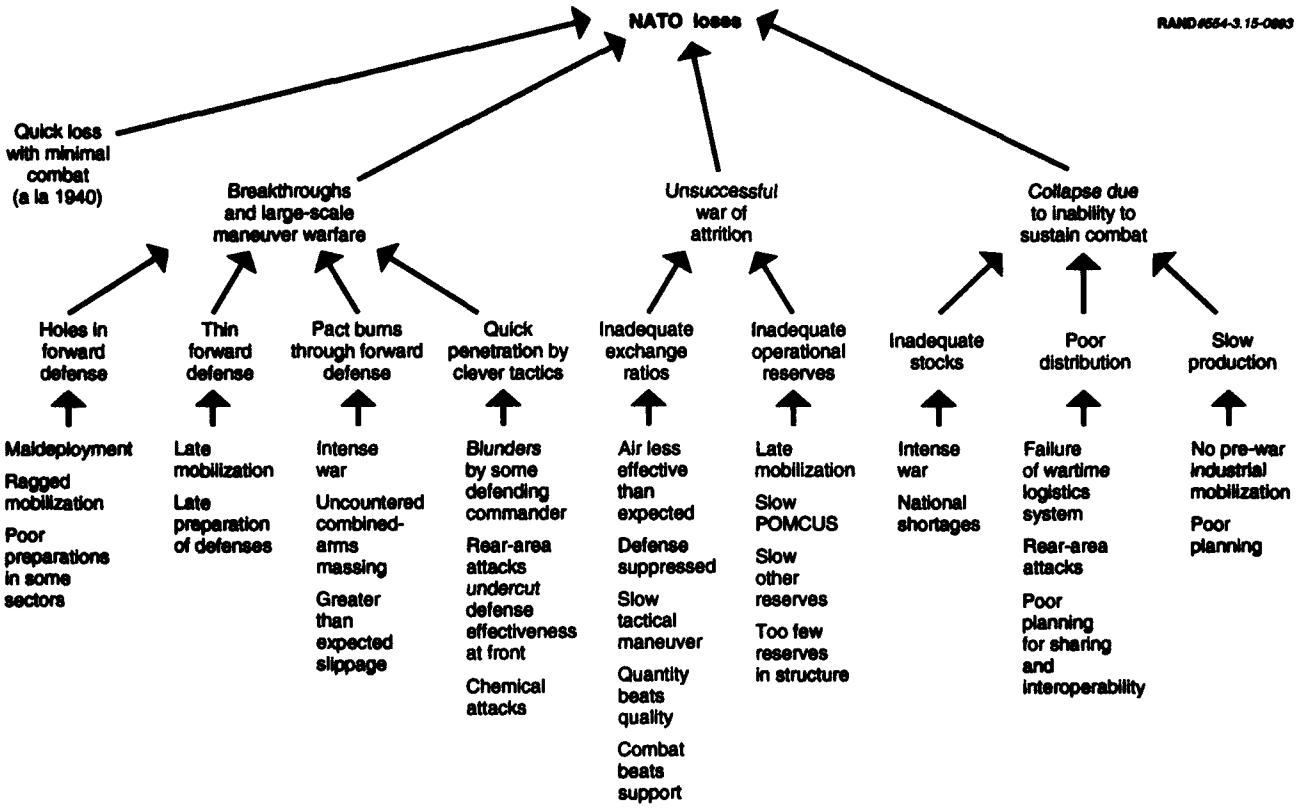

Figure 3.15—A Fault Tree for Central Region Defense, Circa 1987

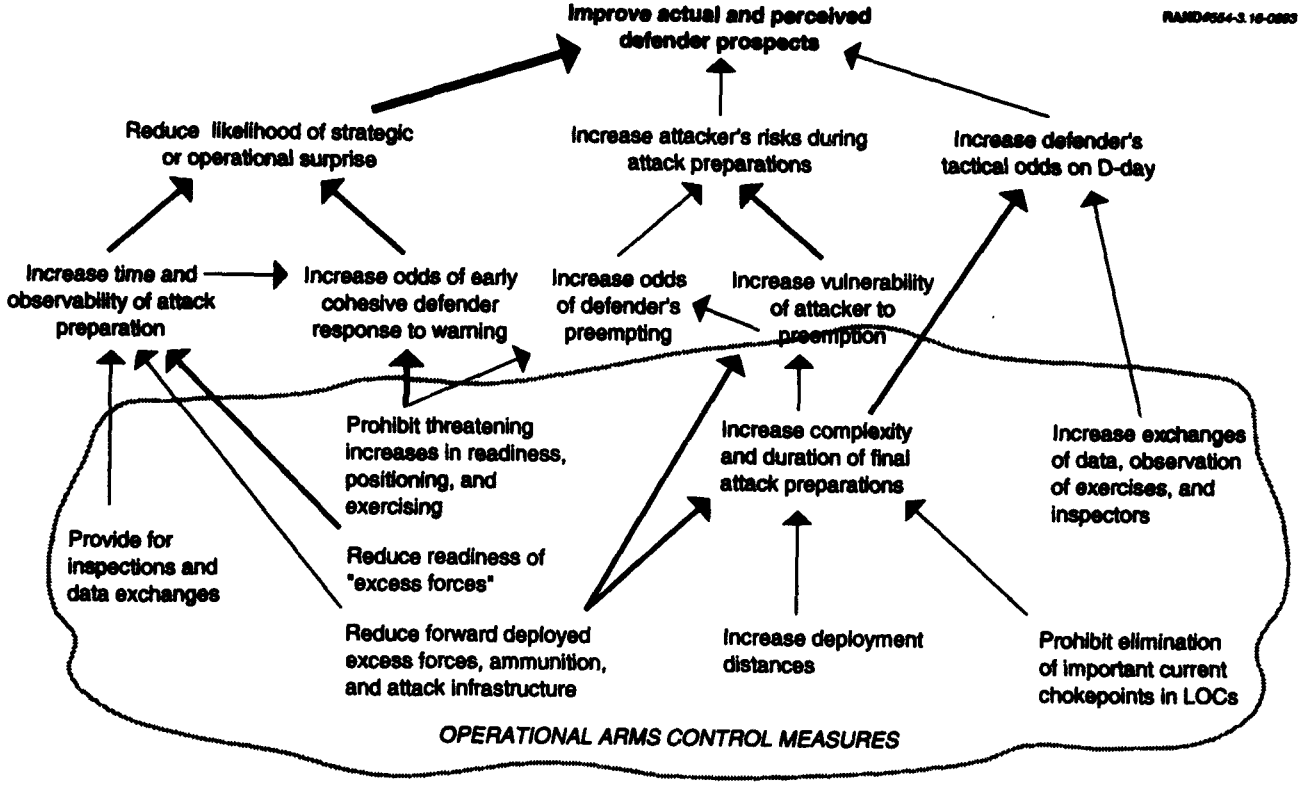

Figure 3.16—Success Tree for Operational Arms Control, Circa 1988

pose of helping analysts and policymakers *converge* under uncertainty on measures that would actually contribute to objectives. Again, both figures derived from the extensive multiscenario analysis.

Marginal Analysis and Leverage Assessment Versus Requirements Analysis

As discussed in Chapter Two, "requirements analysis" has been a dominant feature of defense planning for decades. The intelligence community provides a threat (capability vs. time), one uses various rules of thumb and campaign analysis to estimate the buildup of capability needed to counter the threat, and one then has a "requirement." In the current era, however, such analysis is very dubious, because the threat estimates are arbitrary. Further, we are in a period in which we should be more critical about deciding the level of insurance we are willing to buy. There is no question about our wanting to defend Kuwait and Saudi Arabia, but there are limits to how overinsured we should be willing to be for that, given other national priorities.

We argue, therefore, that it is important for PPBS-related analysis to shift from "requirements-analysis" style toward "capabilities-analysis" style. Figure 3.17 shows an example of the latter. Here we are able to see the marginal value of dollars spent (with some unspecified set of force improvements) and make our own judgment about how much we are willing to pay for the extra increment of protection as one postulates a more and more capable threat. Going from point A to point B has high marginal value; going from point B to point C has much less marginal value—unless one is truly convinced that the level-C "threat" should be taken very seriously indeed. To use a concrete example here, if dollars were not so dear, it would be prudent to assume a substantial late-1990s Iraqi armored force and to assume that that force would be competent and protected by a greatly improved air defense system. However, if dollars *are* dear, we might not be so willing to ignore obvious facts such as the low quality (continuously so over a period of decades!) of Arab ground forces and the extraordinary capabilities of U.S. air power against armored attacks.

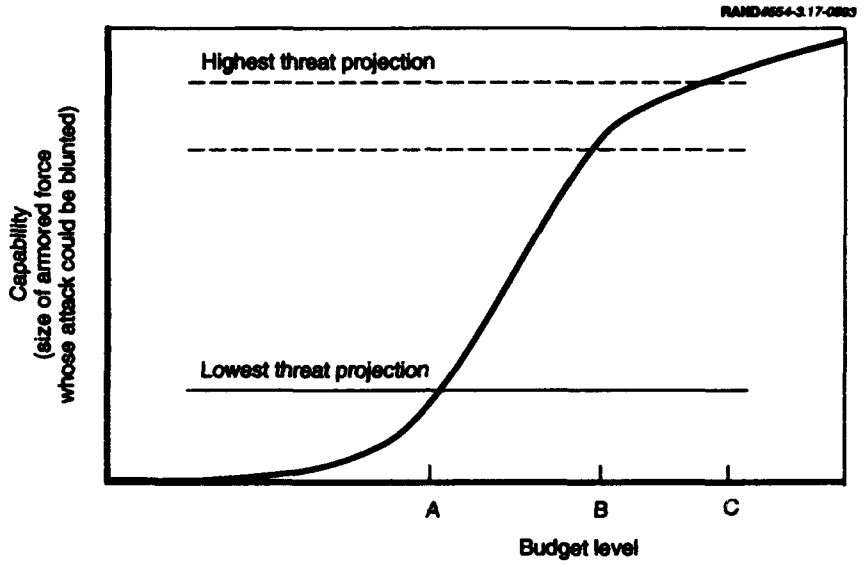

Figure 3.17—Schematic Example of "Capabilities Analysis"

There is a subtlety here. One might look at Figure 3.17, mentally associate the middle horizontal line with a "best estimate," and then conclude that the decision to go with the best estimate was the same as the decision we argue should be made on the basis of the high marginal value of going from point A to point B. That would be a misimpression. Suppose, for example, that the intelligence community's "best estimate" value of the 1997 threat was the "highest threat projection" of Figure 3.17. In a requirements-analysis mental framework, we might feel compelled to buy what it took to deal with that threat. However, in the current world, that "best estimate threat" would probably be highly uncertain. Knowing that the threat might prove to be inflated,[33] we would be especially interested in marginal-analysis considerations. To put it bluntly, even if the best-estimate threat was the highest one shown, we *might* decide to go with budget level B. Life is a series of tradeoffs; we now have *many* threats to our

[33]A substantial factor here would be whether the "best estimate projections" focused strictly on units and their equipment holdings rather than such considerations as personnel strength, readiness, competence, and supportability.

nation, only some of which are future versions of Saddam Hussein or Kim Il Sung, and adjustments in force structure can be made from time to time over the years. Budget levels below point B, however, would be more worrisome.

Figure 3.18 shows a different type of capabilities-analysis display. It shows notionally, in stoplight form, the capability we would expect to have under defense programs at three levels, as a function of *effective* threat level and actionable warning time or, more precisely, the time for deployment prior to D-day. "Effective" force level (in effective equivalent divisions, EEDs) takes into account not only equipment, but the adversary's effectiveness in using it.[34] Thus, the threat could increase through, e.g., coalition, procurement of more divisions, *or* through improved training and doctrine. According to this notional chart, risks would increase significantly as budget level

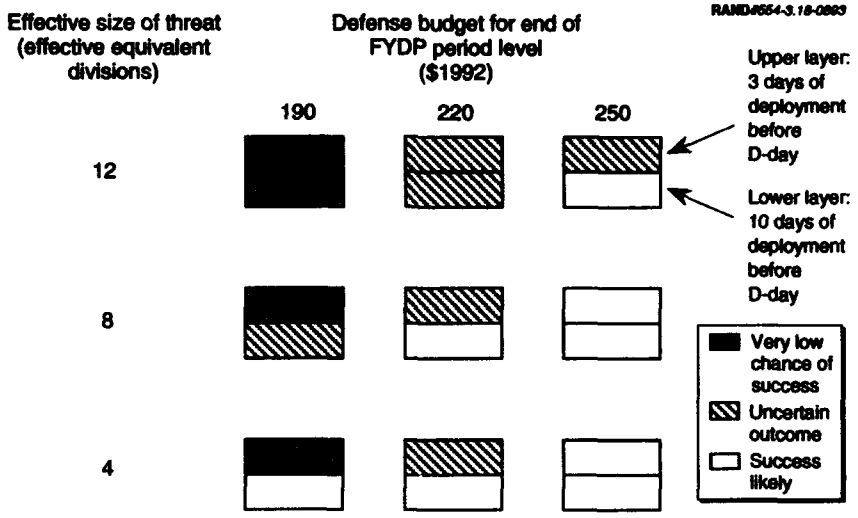

Figure 3.18—An Illustrative Stoplight Chart Showing Projected Capability as a Function of Threat, Reaction Time, and Budget Level

[34]Arab armies, for example, have historically been relatively ineffective in armor battles, with EED scores a factor of two below their equipment scores. See, e.g., Dupuy (1990).

was reduced. Another similar chart might tell a different story, however, if the regional allies were strengthened, in-country prepositioning were increased, forward presence were increased, and so on. Figure 3.18 would be just one of many slices through the problem. Where it is feasible to do so, we prefer more continuous representations such as Figures 3.14 and 3.17, which make it easier to "see" marginal value vs. expenditure. That could be accommodated to some extent within stoplight-chart methods by using five rather than three "colors" or patterns and adding additional levels of rows and columns. Alternatively, one could use three-dimensional drawing techniques, which are available with standard spreadsheet systems. These, however, are more intimidating to many readers.

In reality, competent defense planners have *always* been concerned about leverage, but the terms of discussion were artificially structured to hide that fact. Throughout the late 1970s and 1980s, planners looked at the leverage value of additional strategic mobility, decided it was quite worthwhile, and then established Defense Guidance threats that developed slowly enough so that the desired mobility improvements would be seen as valuable (see, e.g., Office of the Secretary of Defense, 1979a,b). Had they chosen more stressing scenarios (a "no-warning" scenario), the mobility improvements would have had no value. If they had chosen easier scenarios (months of actionable warning), the same would have been true. Similarly, while logic might have dictated a defense-planning scenario of simultaneous conflicts in Europe, Southwest Asia, and Korea, planners quietly decided that that would be buying too much insurance at a high price (perhaps doubling the size of the required mobility forces). Thus, they instead specified a planning scenario with enough of a gap between theaters so that mobility assets could be used sequentially.

Was this a corruption of analysis or strategy? Not really, but there was always something less than candid about it. Again, the key fact is that competent and responsible planners have always looked at the capability-vs.-dollars curve (at least in their mind's eye). We argue here that this should now be done explicitly, with "requirements analysis" being relegated to the backseat.

To be sure, *good* requirements analysis converges on *good* capabilities analysis. One can show program requirements as a function of

threat and end up with the same information as showing capability as a function of expenditures and overlaying possible characterizations of threat. We believe, however, that the capabilities-analysis approach, with its emphasis on marginal improvements rather than hard-and-fast requirements, is far more suitable for the current era.

DIFFERENT TIME SCALES FOR DIFFERENT TYPES OF PLANNING

Throughout this chapter we have emphasized that the key to coping well with uncertainty is the ability to adapt—i.e., to change plans significantly, or even to build wholly new ones as needed, and to do so quickly enough. How quick is quick enough, however? Here the answer depends on the type of planning—strategic, programmatic, or operational. Each operates on a different time scale, as shown earlier in Figure 1.2. Each type of planner has different premiums on speed and dexterity to adapt to unforeseen points in scenario space that may become important.

For strategic planners, a single event such as Gorbachev's December 1988 announcement of unilateral defense cuts may trigger a change in the strategic landscape. By contrast, it may take years for the event's strategic import to become clear. For example, the Bush administration's "Base Force," the first clear manifestation of the strategic shift signaled by Gorbachev, did not appear until two years later, and it may take many more years for the American consensus to coalesce around a politically stable response.[35]

Thus, adaptability to the unexpected in scenario space is important for strategic planners. And the degree of dexterity may be severely constrained by the sluggishness of political response so plans can be adjusted incrementally over time. But for long-term policies, new strategic plans moving in radical new directions need not, and politically cannot, emerge overnight.

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[35]Another source of uncertainty is American political consensus. Until and unless a new national consensus forms around an American grand strategy to replace containment, how the public and political leaders will react to future crises cannot be foreseen with clarity. This is another reason for having a highly adaptive process for building plans. This perspective is described in an unpublished 1992 paper by Finch: "Defense Strategy, Forces and Budgets: In Search of a National Consensus."

Likewise, program planners have a relatively leisurely pace. In part, program planners may need to react to new strategic policies, but on a time scale appropriate to the development of those policies, if not slower. These planners might also need to react to the emergence of a new technology, to a change in the industrial base, or to a shift in resource availability. But here, the reaction time to produce a new plan is probably on the order of a minimum of the two-year budget cycle. And implementation of programs covers many years, so the plans for them can evolve in small increments to adjust for newfound knowledge and conditions.[36]

Operations planners, however, face a problem inherently different from the rest. The emergence of the unexpected—a crisis for a point in scenario space for which no effective plan on the shelf exists—can happen without warning, and demand plans corresponding to different policy-response options on the table for national leaders to consider in hours or days. To put it differently, future military commanders may need to develop radically new operational strategies over a short period of time, but they will have to do so using forces bought years earlier, for a different set of operations.

Historically, of course, not all crises demand quick operations-planning responses. Indeed, the U.S. military has been quite successful in the last decade in choosing when and where to mount operations after months of preparations. When examining plausible major regional contingencies, however, there is reason to believe time may be of the utmost importance. Consider our Desert Storm operations in Saudi Arabia, which were a resounding success. They were successful largely because the strategy chosen by our adversary gave us time—time to construct alternative operational plans, time to have them considered and acted upon by national leaders, and time to refine them continuously during execution. In the words of the DoD report to Congress on the Gulf War,

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[36]Program plans that involve fielding new weapon systems based on technological innovation can have much longer planning horizons. The B-2 bomber serves as a useful example. The initial technological impetus for it began in the late 1970s with fielding it as an effective military instrument almost 20 years later. Planning reaction times for the basic system design were perhaps 5 years, for manufacturing base about 10 years, and for quantity in the force structure almost the full 20-year cycle.

> By early October, CINCCENT was satisfied the "window of vulnerability" had narrowed and that he could conduct a successful defense of Saudi Arabia. The deployment of forces essential for the defensive mission, however, had taken nearly two months (Department of Defense, 1992, p. 51).

Thus Saddam Hussein's course of action bought us time to develop, refine, and implement our plans. As evidence of the scale of change in this refinement, Figure 3.19 shows how estimated lift requirements varied over time (Kassing, 1992). That is, the curve for C+17 was the estimated requirement for sealift vs. time as of day C+17. As the figure indicates, there was great instability in our plans for deployment, an instability that took a month to settle out. Had Saddam exploited the "window of vulnerability" by invading Saudi Arabia immediately after the conquest of Kuwait, the United States would not only have found its forces inadequate for successful defense, it would have found its plans for the deployment of those forces in a high state of flux.

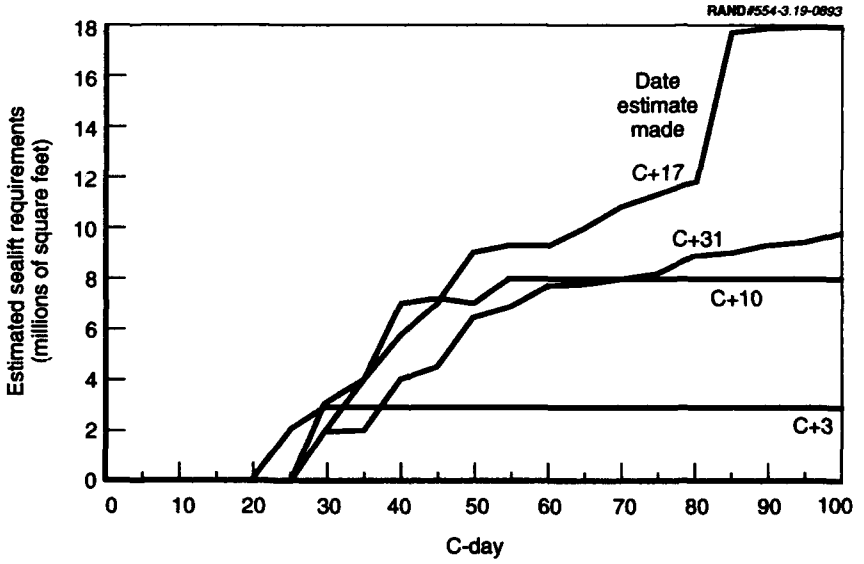

Figure 3.19—Variation in Estimate of Operation Desert Shield Lift Requirements

A future adversary, knowing the consequences of Iraq's failed strategy, will have great incentives to beat the crisis-reaction cycle of the United States. The rate at which we can respond is often thought of in terms of how fast we can deploy forces. That is an important part, but not all, of the response time equation. Figure 3.20 shows that there is a critical front end to this process—planning and consultations that precede deployments. Each element, including those involving military planning, can give the adversary a head start in pursuing military operations. The adversary will want to seize both the political and military objectives it seeks, as well as points of access to the theater before we can respond.[37] As part of this ap-

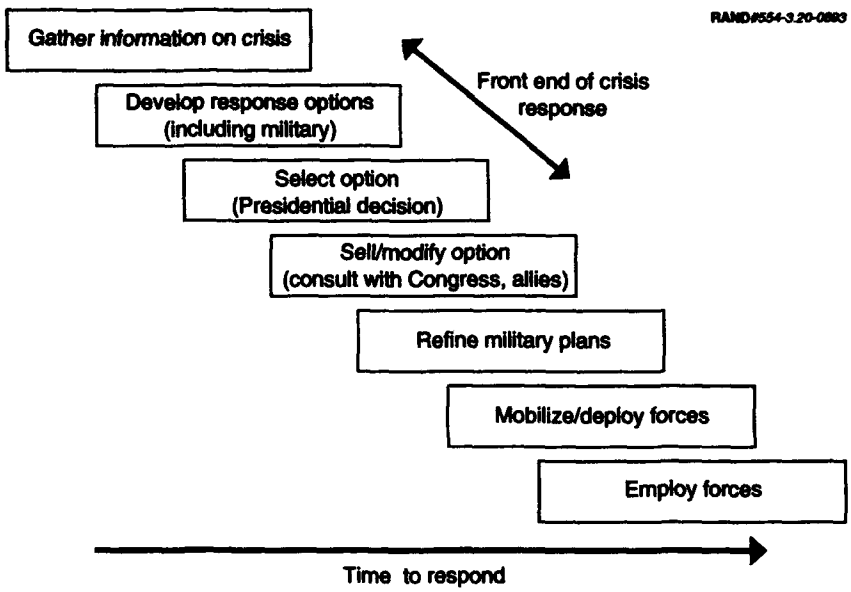

Figure 3.20—Elements of Crisis Response Time

[37]These issues are especially germane if we wish to deter war rather than fight one, but there are profound reasons that *extended* conventional deterrence (i.e., protecting a third country from aggression by a second) is quite difficult (Davis and Arquilla, 1991b).

proach, the adversary will want to take advantage not just of the time it takes to mobilize and deploy our forces. It will want to stretch the front end of our reaction—the time it takes to put together and decide upon operational plans for the response. It will want to drag out planning time. Its approach will be to pose the unexpected—move to a point in scenario space that our off-the-shelf plans do not anticipate, and for which adaptation is difficult.[38]

Rapid Plan Development

One way to cope with the complexity of scenario space, then, is to contemplate many different scenarios and build plans and plan variants for all of them. As should be evident, however, that is not so easily done if one wants to cover whole regions of scenario space as suggested above. It is not even feasible to develop detailed plans for all the relevant cases. Nor is it obviously feasible, in our view, to develop plans "close" to all the cases that would arise in practice, although there are some semantic thickets here (how does one measure "closeness": by the magnitude of certain changes, by the organizational complexity of those changes, or what?). A fundamentally different alternative is to create plans quickly when they are needed rather than relying upon off-the-shelf plans developed under assumptions that have proven faulty. It is this approach that we will elaborate next.

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[38]The value of speediness in planning and replanning has long been highlighted by John Boyd (Colonel, USAF, retired). In a widely read unpublished annotated briefing, "Patterns of Conflict," January 1981, Boyd describes the Observation-Orientation-Decision-Action time cycle (the "OODA loop"). Boyd believes the key to achieving military objectives is one's ability to move through this cycle more quickly and effectively than one's adversary. To the extent that adversaries can generate disorder and confusion disrupting or lengthening our planning and ability to move quickly through the OODA cycle, they may thwart our objectives. Thus, organizing, training, and equipping forces is necessary, but not sufficient. Planning that develops an effective crisis-planning process to "get inside an adversary's OODA loop" may be equally necessary.

Chapter Four

DESIGNING A PLANNING SYSTEM FOR RAPID ADAPTIVENESS

OVERVIEW

The principal tenets of this chapter are that:

- The U.S. should develop the capability for *rapid adaptive planning* of combined-instrument measures in response to major regional (and lesser) contingencies.
- The DoD should organize itself accordingly and lead other agencies in developing and improving the necessary national capabilities over time.
- This effort should start with and build from the recent reforms in operations planning introduced since 1990 by the Joint Staff.

In July–August 1990, the U.S. was ill-prepared for *rapid* decision-making and action to deter or respond to major contingencies. This is hardly surprising, since "the system" was never designed for such purposes. In this chapter we describe and recommend changes.

A central notion here is that strategic planning and program planning should increasingly take an "operational perspective" and seek to provide all the necessary capabilities for appropriate and successful *campaigns* (see Chapter Two).[1] In judging our capabili-

[1]By no means, however, do we mean to imply that the operational, campaign, perspective needed for operations planning is the same as that for strategic and programmatic planning. The former deals with the here-and-now; the latter deals with the distant future, when campaigns may be very different and are surely not well understood in detail.

ties, it is now less relevant how quickly we can deploy armored division equivalents than it is how quickly and well we can assemble and coordinate all the pieces of a campaign—including specialized assets such as AWACS, JSTARS, SEAD aircraft, air defenses, anti-tactical-ballistic-missile systems, helicopter-mobile infantry, MLRS/ATACMs, and both Air Force and Navy strike aircraft and missiles—and do so in the context of coalition operations, sometimes with strange bedfellows as allies. And, as repeatedly emphasized in this study, it is especially important that we be able rapidly to build or adapt *appropriate* operational military and political-military strategies so that the campaigns we initiate achieve our objectives. The campaigns needed may be quite different from those we envision or focus upon today.

Ironically, some of the better strategists and program planners have always taken a campaign perspective in their own reasoning, but "the system" has in the past encouraged them to artificially repackage their work to fit more simplistic molds in which capability for contingency reduces to, e.g., buildup rates of ground forces. Today, such repackaging makes no sense.

With this background, we shall now describe planning-system problems and the changes we recommend. In the next several sections we discuss changes to operations planning, since that is so central to the whole approach. In the last section we discuss how strategic, programmatic, and operations planning can, to a substantial degree, be integrated.

TOWARD FAST, ADAPTIVE, AND OTHERWISE EFFECTIVE OPERATIONS PLANNING

Figure 4.1 describes schematically the components of an approach for further improving our operations planning systems. The top-level components are: (a) organization (i.e., requirements, structure, and processes); (b) skilled staffs and decisionmakers; (c) building-block methods; and (d) tools, notably organizational decision-support tools (ODS). Let us describe these in turn, moving from left to right in the figure.

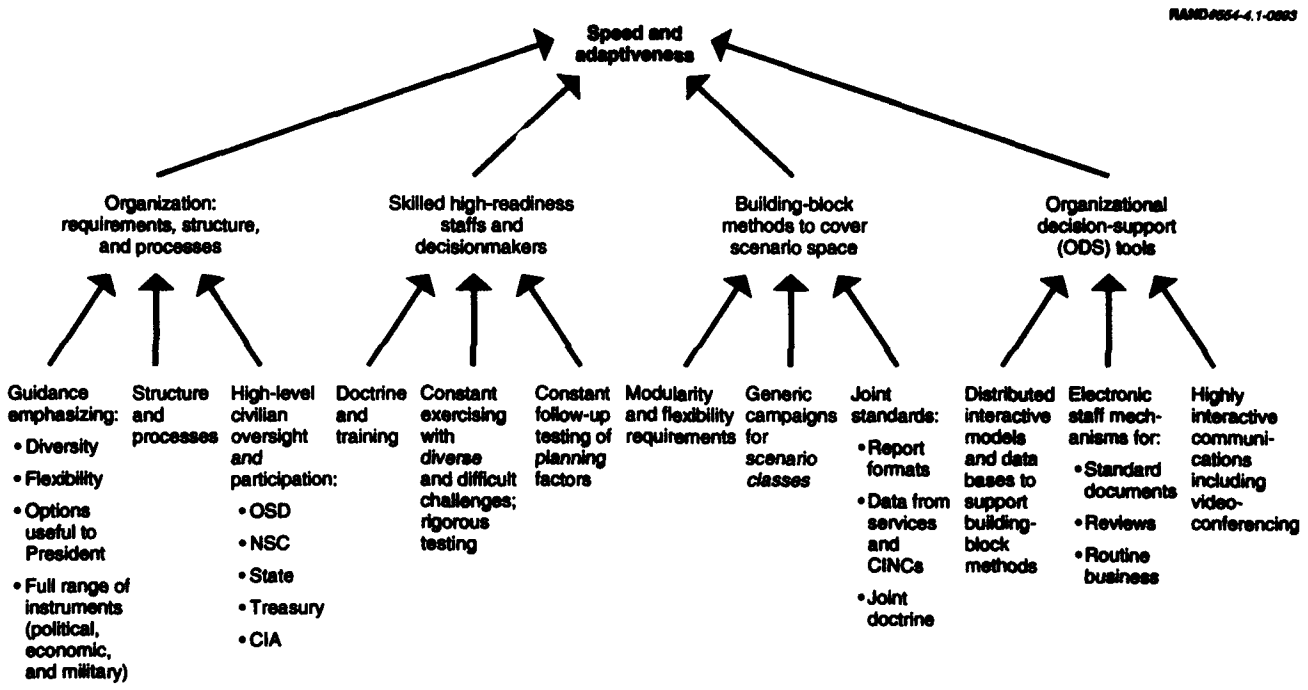

Figure 4.1—Components of an Approach to Rapid Adaptive Planning

ORGANIZATIONAL ISSUES IN OPERATIONS PLANNING

Guidance

As discussed in Chapter Three, the Joint Staff has been changing fundamentally the nature of its guidance to CINCs, emphasizing diversity, flexibility, politically useful options, and a full range of instruments. This process is ongoing, however, and we recommend more emphasis on scenario-space concepts and honing the ability to make rapid at-the-time adaptations that have not all been preplanned. We also believe that current guidance still does not go far enough in anticipating the range of options that will be demanded by policymakers in times of crisis, primarily options that go beyond FDOs but fall short of deploying decisive force. Nonetheless, guidance to CINCs is already the *strongest* component in the approach we suggest in Figure 4.1.

Structure and Processes

The Current System. Our principal concerns with the current operations planning system start with structure and process. The current system has two parts (Figure 4.2). The first is "deliberate planning," which includes development of both concept plans (CONPLANS) and operations plans (OPLANS). CONPLANS sketch concepts of operations, while OPLANS develop and define them in great detail, down to the level of a highly crafted time-phased force and deployment list (TPFDL). OPLANS can be translated readily into actual force orders. The second part of the current planning system is "crisis action planning."[2]

The main features of the current deliberate planning process are that it:

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[2]There are also significant organizational separations. Operations planning falls under the Joint Staff's J-3, but deliberate planning is done by the CINCs in response to the JSCP, which is a J-5 product. The products of deliberate planning are reviewed in a process overseen by the J-7.

- Produces OPLANS and CONPLANS for applying U.S. military force in specific scenarios postulated by strategic guidance[3] and additional CONPLANS for other scenarios requested by the military commanders.[4] As the result of recent changes in policy, Joint Staff guidance requires the CINCs to develop several response options and to build considerable flexibility into both OPLANS and CONPLANS (see Chapter Three).
- Involves the "total participation of the commanders and staffs of the Joint Planning and Execution Community (JPEC)"[5] and uses the bulk of the management and staff resources available for operations planning in peacetime.

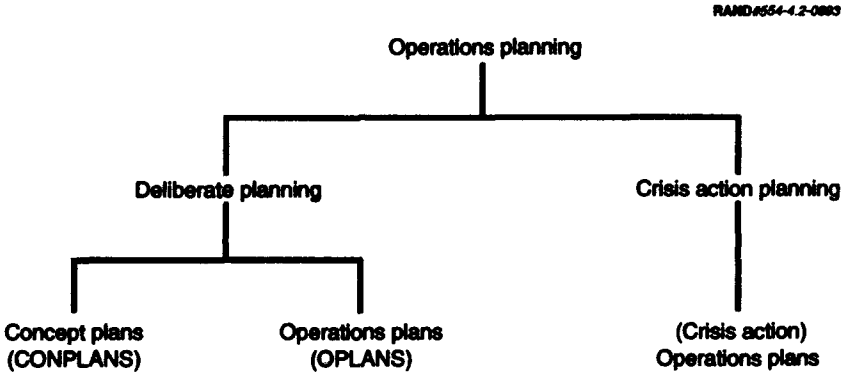

Figure 4.2—Taxonomy of Operations Planning

[3]The principal sources of strategic guidance are the National Military Strategy, the Defense Planning Guidance, and the Contingency Planning Guidance. See Department of Defense (1991), Appendix K, Chart 1.

[4]See p. 6-14 of *The Joint Staff Officer's Guide 1991* (Department of Defense, 1991), henceforth referred to as the Purple Book. It notes that "The CINC's planning tasks are not limited to those specified by higher authority. The CINC may prepare plans considered necessary to discharge command responsibilities."

[5]Purple Book, p. 6-3. Here the JPEC refers to the "headquarters, commands, and agencies involved in the training, preparation, movement, reception, employment support, and sustainment of military forces assigned or committed to a theater of operations." Thus deliberate planning involves a large number of organizationally diverse participants. For a sense of this, see Purple Book, Figure 6-2, p. 6-7.

- Uses a multiple-step, top-down planning process that "may require 18 to 24 months to completely prepare and fully coordinate a plan" (Purple Book, p. 6-4).
- Uses C^3 channels that are almost exclusively confined to military chains of command.[6]
- Focuses on deployment, not employment.[7]

The main features of crisis action planning are that it:

- Produces in crisis operations plans specific to the situation, either using or modifying plans developed in deliberate planning, or developing new ones from scratch.
- Relies primarily on activating ad hoc "crisis action teams" for staffing the planning process with possibly very limited JPEC involvement for security reasons (Purple Book, Figs. 7-4, 7-8).

The present system seems to produce what had been intended over the years—operations plans for forces to mobilize and deploy in reaction to a small set of specified scenarios. The deliberate planning part, at least, is also relatively straightforward, although with an immense amount of detail. Conceptually, it involves an orderly sequence of steps that start logically at the top and proceed downward to provide ever greater levels of detail (see Figure 4.3). The present system has also had some successes, notably the operations in Granada, Panama, and the Persian Gulf.

Speculative Concerns. The question now is whether the present organizational approach is appropriate for dealing with massive uncertainty and the need for *rapid* adaptive planning in crisis. It is too early to know whether the system will successfully accommodate to the Joint Staff's guidance requiring greater flexibility. On the one hand, it is significant that the Joint Staff (J-5) officers following devel-

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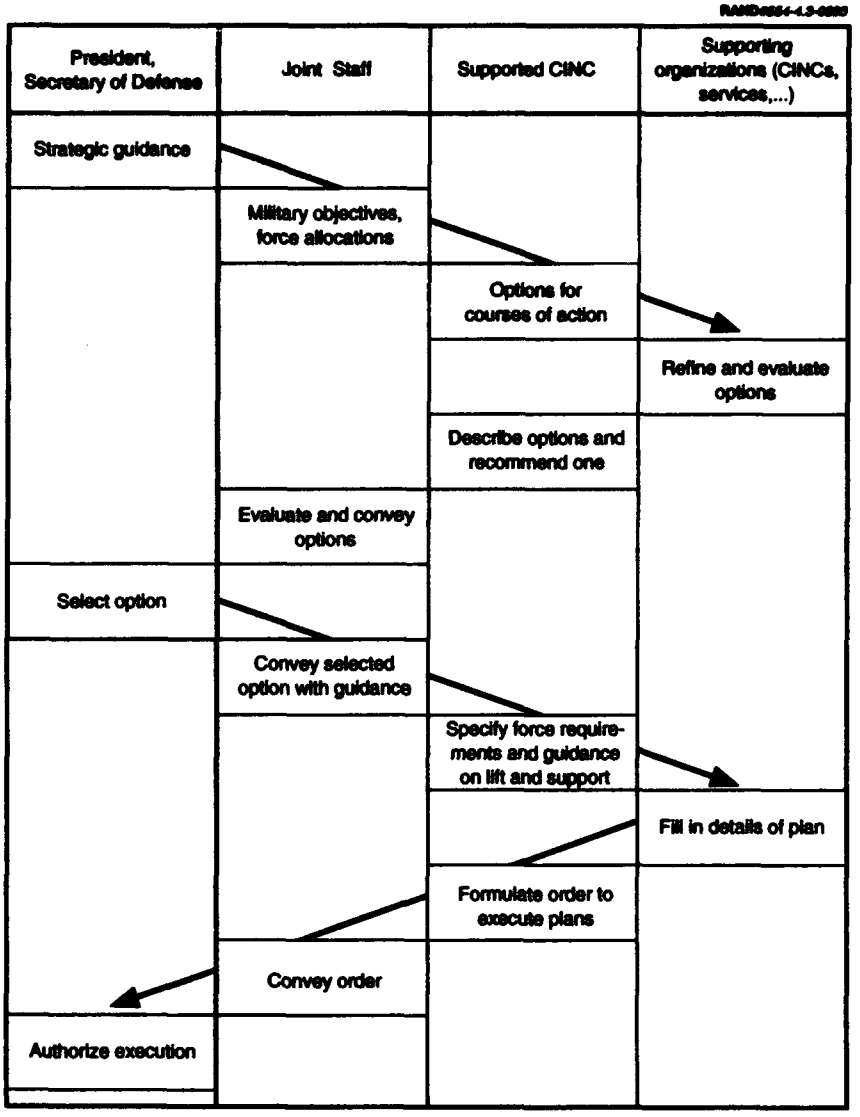
[6]See Purple Book, Appendix K, Charts 2–4. Note the absence, in these charts, of systematic participation in the deliberate planning process of senior political leaders or their staffs.

[7]Purple Book, p. 6-4, notes for example that "We will outline the entire environment of joint operations, but will focus on deployment planning . . . in large part . . . because deployment planning is the focus of real-world JOPS [Joint Operational Planning System]."



NOTE: This chart is the authors' distillation of the current operational planning process as described in the Purple Book (Department of Defense, 1991). See Appendix K of that reference, Charts 2 through 5, which provide a more detailed layout of the present process for developing operational plans.

Figure 4.3—Series Processing of Operations Plans in Crisis

opments on this are optimistic. On the other hand, despite the J-5 optimism, and despite the impressive improvements that have been made in guidance such as the Joint Strategic Capabilities Plan (JSCP), we remain cautiously skeptical.

Our concerns are based on general considerations of resistance to organizational change. A standard response of a mature organization to top-down demands for change is to adopt the new terminology, to say the right things, and indeed to make changes that *it* considers to be both painful and very significant. Those changes, however, are often far less drastic than what is needed and desired, and much less far-reaching than what those at the top naively believe is happening based on initial reports. Also, some of the changes prove to be one-shot events, with the organizations falling back to prior procedures and mind-sets when the reformers move on to other matters. Some examples may be useful here (see also Appendix C, which describes lessons from corporate experience on organizational learning):

- The U.S. Postal Service made many improvements in demands for reform and better service, but did not introduce overnight express mail until years after Federal Express created an industry and "forced" it to do so.
- Computer-services departments in organizations everywhere reacted to the emergence of personal computers by attempting to patch up the services they could provide with mainframes, rather than procuring the personal computers, which often entered organizations through the back door "over the dead bodies of the computer-services managers." What was needed was revolutionary change, but the computer-services departments attempted instead to work within their existing system.
- Within the military planning world, the proponents of the JOPES system continued to make promises and to make incremental improvements that had the effect of putting off proposals for more drastic change, but when Operation Desert Shield began, dissatisfaction with the system was immediate and new technology had to brought in ad hoc (more on this later in the chapter).
- When analysis organizations that use large and complex models are asked to do uncertainty analysis, they can do so—at consid-

> erable effort—but they often vary only a few of the hundreds of important variables (and often not the most important ones), in large part because their methods and models do not allow them to do more extensive uncertainty analysis.[8]

It seems to us, then, that it is questionable whether the far-reaching changes sought by the Joint Staff (and the even more ambitious changes we recommend) will be obtained by merely improving the deliberate planning system, rather than replacing it. To many observers and participants, the system as of 1989–1990 reflected an ossification of planning resulting from the long Cold War, the apparent "stability" of threat, and the peacetime pressures for detailed staff work and large and complex processes.[9] Deliberate planning appeared to be diametrically opposite in character to what seems natural to American military officers, who pride themselves on being adaptive. The system was to a very substantial degree appropriately described with such adjectives as "monolithic." It emphasized precision and tailoring rather than flexibility, even though much of the precision was known to be an illusion.[10] Surely, many of the related mind-sets remain and are tending to undercut efforts to reform the system.[11] Thus, we advise caution and skepticism.

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[8]It is not uncommon for large and complex models to run on "scenarios" that take six months to construct and tune. These scenarios include orders of battle, weapons-performance data, terrain data, and detailed assumptions about operational and tactical decisions over time (i.e., they include "scripted" commands). In such cases it is quite difficult to do extensive multiscenario analysis because many changes call into question the appropriateness of the scripted commands. Fast computers (even of the Cray variety) do not solve this problem, because it is setup time (i.e., the time required to establish or modify the "scenarios") that is limiting.

[9]Colleague James Winnefeld noted in his review that the seeds of this ossification actually go back to the careful and detailed planning processes established by the Prussian General Staff, which captured the imagination of other militaries after 1870 and eventually became entrenched in U.S. military planning as taught at Newport and Leavenworth.

[10]As an example here, deliberate planning seeks to refine the TPFDL and "optimize" use of strategic lift (even to the extent, sometimes, of breaking up a unit to send some parts on one platform by one route, and some parts on another platform and another route). However, that optimization (akin to "tailoring" in other contexts) reduces flexibility to change the TPFDL quickly. Flexibility would be maximized by maintaining unit integrity.

[11]We would expect, of course, that this would vary considerably from one command to another because of CINC personalities, the nature of the commands' current problems, legacies peculiar to the commands, and other factors.

Indeed, we suggest more extensive structural changes that would build on recent progress.

In thinking about what should be changed, we see in particular the following problems:

- The vast majority of planners and expenditures are focused on deliberate planning, not crisis planning. That is, the weight of effort is on "deliberate" activities.
- Deliberate planners do not spend time learning how to behave in crisis. Deliberate planning: (a) is strongly sequential and ponderous (Figure 4.3);[12] (b) uses information and communication systems different from those for crisis action; (c) is largely disconnected from civilian policymakers; and (d) is very decentralized (i.e., the Joint Staff's role in deliberate planning is more like that of reviewers than that of a General Staff), despite the importance of centralized decisionmaking in fast-moving crises.

The most basic problem is perhaps the first, that "the system" was designed primarily for peacetime "deliberate" planning for a few cases, rather than for producing rapid-planning capability per se.

With this backdrop we have the following recommendations:

Recommendations

— Restructure the system so that crisis action planning is primary, not secondary. Eliminate deliberate planning per se. As discussed in Chapter Three, planners would still spend substantial time developing analytical baseline plans, but the bulk of their time would be spent exploring what-ifs, developing building-block responses, training and testing through simulations and exercises,[13] and con-

[12]We are sensitive to the fact that crisis planners (i.e., the *people*) often become adept at "working the system" and behaving adaptively. Our point, however, is that they are rising above the system itself and that if we want to see adaptive planning in more stressful circumstances (e.g., a future Desert Shield/Storm in which the opponent doesn't make so many mistakes), we need major and more drastic changes.

[13]To return to the football analogy suggested by J-5 staff and discussed in Chapter Three (current adaptive planning methods are developing the analogs to "playbooks,"

ducting detailed studies to establish and update planning factors.[14] Also, as discussed at the end of the chapter, operations planners would spend some of their time evaluating possible strategies and programs.

— Among other changes in procedure, replace the currently sequential process, in which decisionmaking goes down the line, then up the line, then down the line, then up again yet another time (Figure 4.3) with something that includes more parallelism, perhaps as in Figure 4.4, to increase planning speed (see also Purple Book, p. 7ff). Conduct a survey of crisis-action planners to identify procedures they have used successfully ad hoc, and consider making those standard. In the language of modern organizational theory, we should increase horizontal and vertical integration to create more of a *virtual organization.* This merits further work.

— Establish high-visibility forums at which CINCs can describe and demonstrate, in detail, their methods and tools for rapid adaptive planning. In other words, go beyond top-down methods of accomplishing change by establishing competition and markets.[15] Such "trade fairs" could be held at CINC conferences and in more specialized settings.[16]

"audibles," "triple options," and so on), suppose that a professional football team spent 80 percent of its calendar months developing, publishing, and coordinating its playbooks, rather than training and exercising. How ready would that team be for a tough football game? Or, to use another analogy, which works better in developing highly flexible and appropriate software, long and detailed design-and-review-before-code processes, or a combination of rapid prototyping (equivalent to exercising) and design?

[14]More generally, many and perhaps most of the current functions performed in deliberate planning would still be accomplished, but in a different framework.

[15]This recommendation was first presented in a briefing by Paul Bracken and Paul Davis given to the Joint Staff in 1991 and included in a working draft early in 1992. Appendix C contains some highlights of that material, which draws on business experience to suggest implementation strategy for the Joint Staff.

[16]RAND, for example, has held conferences under Joint Staff auspices to bring together the strategic-mobility community for exchange of information on problems, new ideas, and technology.

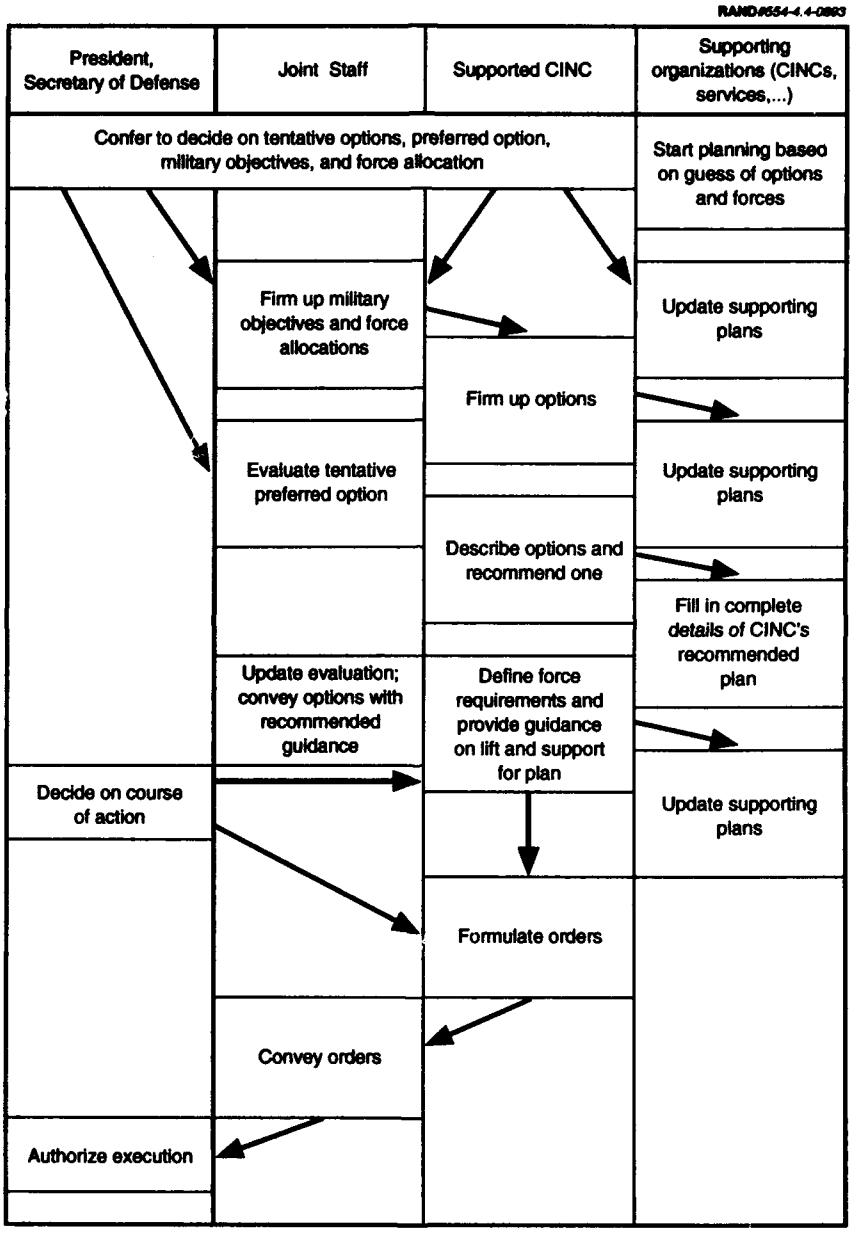

Figure 4.4—Proposed Parallel Processing in Crisis

We have other structure-related recommendations, but they are better presented in subsequent sections involving exercises, training, and information systems.

SKILLS AND READINESS OF STAFFS AND DECISIONMAKERS

As indicated in Figure 4.1, we see three principal subcomponents affecting skill and readiness: (a) doctrine and training, (b) regular exercising with difficult challenges and rigorous testing, and (c) follow-up studies to test and correct planning factors and other assumptions. We will touch on all of these in what follows, but not in this order.

Problems in the Current System: Inadequate Training and Practice

Skill in any endeavor comes with training and testing against realistic standards. Indeed, the success of Operation Desert Storm (ODS) depended heavily on superb training in the likes of the Army's National Training Center, the Air Force's Tactical Fighter Weapons Center, the Navy's Strike Warfare Center, and the Marine's Air-Ground Combat Center.[17] Considerable training also occurred in Saudi Arabia itself before the coalition's offensive.

With this in mind, we see the following problems in the current system:

- Minimal realistic testing for large and stressful contingencies, with excessive emphasis on training and exercises that follow heavily scripted versions of standard cases.
- Inadequate participation by civilian and military decisionmakers.
- The absence of mechanisms, standards, and promotion criteria that emphasize demonstrating skill in rapidly moving large-scale nonstandard contingencies.

[17]See Department of Defense (1992), Appendix D, p. 9.

- The absence of texts, computer systems, and training programs to prepare staff for rapid planning under uncertainty and chaos in MRCs.

Consistent with our recommending that the overall system be restructured around perfecting skills for crisis action, we urge initiatives that would introduce:

Recommendations

— Extensive and continuing wargaming and exercising, sometimes with participants from OSD, State, National Security Council, Treasury, Commerce, CIA, and, upon occasion, Congress and foreign governments.

— No-notice exercises involving realistically complex initiating circumstances and real-time trouble-causing play by appropriate civilian and military decisionmakers and their staffs.

— Success criteria that would consider not the richness or efficiency of plans for dealing with standard scenarios, but the ability to produce viable plans covering the range of alternative political-military objectives in a crisis of unanticipated character in a very short period of time.

— Well-funded Joint Staff mechanisms for routinely following up on exercise play to determine whether planned actions would in fact have been executable. Similar well-funded Joint Staff mechanisms for routinely testing and updating planning factors.[18]

— An independent authority for assuring the integrity of the testing system (a kind of "Readiness Inspector" for planning readiness, who would report to the Secretary of Defense, or to him and the Chairman of the Joint Chiefs of Staff).

[18]Most of the testing and updating would presumably be done by the commands or the services, but the Joint Staff should have absolute authority for assuring the quality and integrity of this work.

— An NSC-directed, DoD-managed process for developing crisis-planning doctrine and training for senior civilians in relevant agencies.[19]

Discussion of Recommendations

All of these changes would have major ramifications and associated difficulties. We shall discuss only a few here.

No-Notice Exercises. We believe no-notice exercises with troublesome nonscripted scenarios are *essential.* However, such activities cause trouble because people sometimes fail as they learn, and this can unreasonably damage careers or cause embarrassments unless appropriate protections exist. For most serving officers (as for most workers in the civilian world), such tests are not at all welcome, to say the least. Nonetheless, it is possible to create mechanisms where they are effective, fair, and even enjoyable. The services all have experience working these problems. For example, the "Opposition Force (OPFOR)" at the Army's National Training Center is as tough, skilled, and adversarial as it can be, and units who have trained at the NTC have often been humbled in the process, but their commanders have advanced rather than lost their careers. Let it suffice for us to say that we are quite sensitive to the difficulties, but confident in the ability of the services and Joint Staff to create appropriate mechanisms. A great aid in all this is the emergence of computerized wargames, which can permit teams to play through large numbers of cases time and again, thereby avoiding the chance that any one pass through the problem might have a capricious effect on careers. Note, however, that the high-level planning we are most concerned about is best learned and exercised for the most part in CPX activities, without the full-up complexity of standard large-scale military exercises. Further, it should not get bogged down in details. This, in

[19]So far as we know, there has been little work of this sort in the past. There have been some exceptionally useful political-military games conducted over the years, however, many of them sponsored or encouraged by the Director of Net Assessment in the Office of the Secretary of Defense, the Naval War College, the Joint Staff, FEMA, or the White House. Few of these have had explicit education-and-training functions, however, and we are not aware of appropriate texts. Some of the many difficult issues are discussed at the end of the summary in Davis and Arquilla (1991b).

turn, establishes requirements for aggregation, aggregated models, and aggregation-related tools (Davis, 1993a).

Follow-up Testing of Planning Factors and Executability. As Operation Desert Shield demonstrated, planning factors can be substantially in error (e.g., errors in the utilization rates of aircraft[20] or the availability of sealift). As an example of the latter, Figure 4.5 depicts the contrast between the expected and actual availability of sealift from the Ready Reserve Force (Kassing, 1992, p. 33). It shows a major shortfall in lift availability during the crucial early days of the "window of vulnerability" in the Gulf crisis. If known in advance, such a shortfall could have significantly influenced the CINC's operations plans, and even the NCA's decisions about course of action. Since the actual executability of an operations plan can be no better

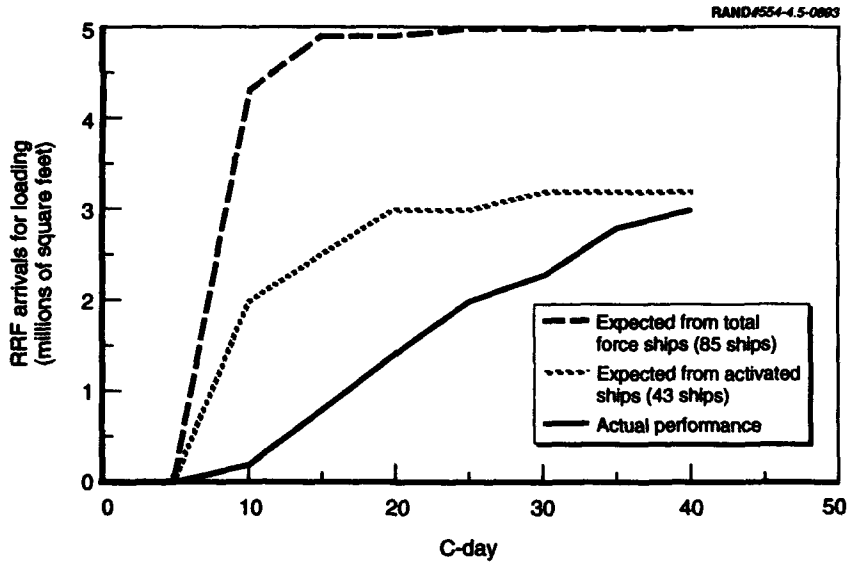

Figure 4.5—Ready Reserve Force Expected Versus Actual Performance in Desert Storm

[20]See Lund and Berg (1993) for a detailed study of airlift issues in Desert Shield and Desert Storm, including commentary on why planning factors proved to be optimistic.

than the planning factors on which it is based, these need to be checked in a rigorous and realistic process of simulation and exercises.

This said, the *inherent* uncertainty of many such factors makes it inappropriate to seek great precision or to characterize planning factors as solid even when they have been carefully developed. Ultimately, political decisions and decision times will dominate in this domain, and no one can predict confidently what those will be. *This argues strongly for a more aggregated and parametric approach to planning, and explicit discussion of odds,* even though normal organizational pressures are very much toward greater precision.[21]

A Readiness Inspector for Testing and Planning Factors. While readers familiar with recent U.S. history may shake their heads and say that the last thing the U.S. needs is yet another inspector general or independent investigator, we believe that having independent evaluation of the planning system is important. There are too many pressures operating to corrupt the process. No one likes no-notice testing; no one likes to fail; no one likes to be under pressure to be able to perform quickly; and so on. Further, in the domain of planning factors, "can do" biases can inflate planning factors, military conservatism and service-program biases can work in the other direction, and political pressures (usually implicit) exist to have planning factors correspond to programmatic goals and congressional testimony.[22] The DoD has not had an entirely happy record in sorting these matters out over the years, although the record is mixed.[23] Since human nature is unlikely to change drastically over

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[21]For related discussion of verification, validation, and accreditation of computer models in instances in which uncertainties are important, see Davis (1992b, p. 11).

[22]An example here was the deployment time for U.S. reinforcement of the Central Region during the Cold War. The planning goal was ten divisions available in ten days, as the result of forward deployment and POMCUS. At no time, however, was the goal achievable. On the other hand, those who constantly quoted final closure times for the POMCUS divisions were also engaging in gamesmanship, because *some* of the divisions could obviously fight with *some* degree of effectiveness and sustainability long before overall closure occurred.

[23]Operations Desert Storm and Shield revealed many successes of planning factors and many problems. Some of the problems involved sealift, airlift's utilization rates, and attack-helicopter sortie rates. In some instances, performance was better than planning factors (e.g., deployment of Marines using MPS equipment).

the next decade, we believe organizational safeguards are needed here.[24]

Obtaining Participation of Policymakers and Other Agencies

A standard lament in response to our arguments on the need to include policymakers has been that it has proven consistently difficult to obtain participation in Joint Staff exercises of the senior people who are most needed.[25] Sometimes the actual participants are reasonable stand-ins, but often they are not. Further, the crisis system may ultimately be no better than the policymakers themselves, and if those policymakers have no experience in rapid strategic decisionmaking, a good military operations planning process may not be able to compensate.

Here we believe there is no alternative but to escalate the issue to the Chairman of the Joint Chiefs and the Secretary of Defense, urging them to *insist* on appropriate participation, including, in some instances, their own. Such participation could reasonably be made a formal performance requirement within the Senior Executive System.

So much for sticks. In our experience, carrots work better in obtaining participation. As carrots for obtaining participation in exercises of policymakers and appropriate staff, we make the following recommendations:

Recommendations----------

— *Magnet participants.* When even a very few of the right senior people participate, others will follow. One approach here includes using *senior retired or out-of-office participants.* Again, even a few can be a magnet for others, not because of their "name," but because of their capabilities, knowledge, and perspectives.

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[24]We note here that the first Army Inspector General (Baron Von Steuben) was hired during the Revolutionary War to do what we are proposing, assure readiness by inspecting drills and training.

[25]This was emphasized to us by Captain Wilson Fritchman (USN) of the J-5.

— *Substance-to-nonsense ratio.* Some military exercises are boring to senior participants because, most of the time, not much of interest is happening and events are proceeding by a script. Even worse, some exercises involve briefings that do not candidly address the real issues, but instead focus on one or another concern of the organization.[26] By contrast, others are provocative, challenging, and stressful. These, of course, do not follow a script.

— *Realistic political-military play.* Efforts to constrain political-level participants, e.g., by asserting that various military options do not exist or would be unacceptable to the military authorities, are counterproductive. By contrast, spirited debate among senior participants to assure that play is realistic and decisions are taken with full regard to risks, is very much to be encouraged.[27]

— *Social setting.* Some of the more successful games and exercises (e.g., the Naval War College's summer games) have important socialization functions: people get to know each other and establish contacts that prove useful over a period of years. There are opportunities for informal discussion.[28]

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[26]A notorious example of earlier years was the emphasis by staff in nuclear exercises of the "SIOP degrade problem." If policymakers insisted on using strategic bombers and tankers for conventional missions or deterrence missions, they would then become unavailable for their SIOP functions. This "SIOP degrade" often seemed very important to nuclear staff planners, but was considered trivial by policymakers and most senior military officers, who expected that plans would assume such diversions and who believed that U.S. nuclear capability was massive enough so that the diversions should not have been especially troublesome in the larger view.

[27]Some of the more sensitive subjects might include: deploying tripwire forces, deploying carrier battle groups into confined waters such as the Persian Gulf, accepting a foreign military leader as having command over U.S. forces in a U.N. action, deploying forces without a clear sense of outcome (e.g., something that would be seen by some participants as a replay of Lebanon), restricting deployments to a conflict theater for one or another reason (e.g., desire to maintain a strategic reserve or to avoid more extensive mobilization) even though this would create arguments about what constituted decisive force, or limiting military objectives.

[28]Such personal relationships are often critical to commanders in crisis operations, especially when ad hoc task forces must be used. See, e.g., the chapter by VADM Joseph Metcalf (USN) in March and Weissenger-Baylon (1986). Metcalf commanded the Grenada operation.

— *Spice.* Although this can be overdone, it is sometimes quite interesting and substantively useful to have roleplayers representing the news media (perhaps with evening news clips) and congressional leaders.

— *Follow-up.* The people most needed in exercises of the sort we are discussing are those least willing to spend their time in such "games" unless there will be tangible results: changes of procedures, strategies, tactics, information displays, doctrine, and so on, or option papers for policymakers to consider.[29] A minimum criterion here may be that important exercises have prompt—and nontrivial—follow-up reports that are read by the SecDef and CJCS. Allowing participants to append their own comments might also be useful here.[30]

BUILDING-BLOCK METHODS

Preliminary Observations

The third component of our approach (Figure 4.1) involves building-block methods, which are the key to rapid adaptive planning in many walks of life. To those who happen to have studied complex organizations (including living organisms), the ubiquity of building-block methods is evident. For others it may not be, and there may even be reluctance to recognize them when they exist, primarily because of emotional reactions to bad experiences in which they have been forced to use *poor* building blocks of one form or another, or in which they discovered that the building blocks they were given to work with had to be modified. It is not unusual for craftsmen (including military planners) to insist angrily that building-block methods do not work and cannot work, because they are aware and proud of the common need for expert tailoring where standard

[29]One of the most famous DoD exercises was Nifty Nugget, which occurred in the late 1970s and had a significant effect on mobilization planning. To this day, many senior officials and officers recall the exercise favorably.

[30]One of us (Davis) has participated in many political-military wargames and can personally attest to a certain frustration as to whether the wisdom and insights of senior players are effectively and accurately passed on.

pieces don't work. Ironically, these same people use some building blocks constantly, whether or not they think of them in that way. If they did not, they would not be successful.[31] Having said this, let us state categorically that classic operations planning in the era 1961–1990 was not modular and did not use building-block techniques extensively. As a result, it was not very flexible—although individual officers made it more flexible than it "should have been" by learning to work around it.

This is changing as the result of the Joint Staff's insistence on flexibility, but we find that the intellectual concepts are not well understood among planners. They know examples of building-block techniques, by one or another name, but they are not taught related design and management techniques with the full benefit of the science that exists for managing complexity adaptively. Nor do they have suitable decision-support tools.

Definitions

We have alluded to building-block methods, but have not fully defined them. The essence of a building-block approach is as follows:[32]

- Think not in terms of building a single optimized and monolithic plan in advance, but rather of *assembling* a context-specific plan at the time it is needed.
- Do the plan building by assembling "building-block subplans" that call for employing "building-block forces" and other instruments.
- Accept the nonoptimality (for a specific task) of using standard building blocks as the price of being able to assemble diverse, adequate, and executable plans quickly.
- Exploit hierarchical principles.

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[31]Nobel Prize winner Herbert Simon discusses related issues in his famous essays on complexity and adaptive systems (Simon, 1981).

[32]Precisely this approach was followed for some years in Central Region–oriented analytic wargaming with the RAND Strategy Assessment System. See Davis and Howe (1990b).

- Recognize individual building blocks as "modules." They are: (a) self-contained, (b) independently testable, and (c) fitted with well-defined interfaces to the "outside."
- Make arrangements for integration testing, because testing of individual modules does not always assure that the system assembled from the modules will work as intended.[33]

The two most confusing aspects of building-block methods are probably: (a) the role of hierarchies, and (b) the many dimensions of building-block methods. Hierarchies are perhaps the most important organizing principle to be found in the natural world and the world of human organizations. Even systems nominally described as networks usually are hierarchical in some respects. They can be confusing, however, because building blocks are composed of building blocks and combine to form higher-level building blocks (e.g., the Reforger deployment was a higher-level building-block operation). Building blocks also exist in many dimensions, as suggested in Figure 4.6.

One might ask at this point, "Is *everything* a building block?" The answer is no. Consider first the familiar task of homebuilding. Bricks, which come in a relatively small number of standard sizes and shapes, are building blocks. But construction usually requires some special chipping and fitting to fill in where the standard bricks don't fit. Similarly, the armed forces tailor their units for specific missions (e.g., by reinforcing a unit with additional helicopters) and develop special-purpose capabilities (e.g., Desert Express). CINCs may establish special task-force commands. And, of course, wartime commanders invent new operations to exploit capabilities and needs that have not yet been recognized in doctrine. So, not everything is a building block. Nonetheless, in a good planning system, effectiveness depends on a large percentage of the "things" and "processes" having been standardized and on practice in the quick assembly of plans and specialized tailoring needed to fill in gaps. American crisis-action planners are very good at this, but they are usually

[33]There are one-to-one correlations between what we here call building-block methods and modular hierarchical design of software. The complexity problems of software often trace to failure to use modular hierarchical design.

Forces:	Battalions, brigades, divisions; Squadrons, wings...
Mobility systems:	Airlift available at CRAF I, II, and III; MPS squadrons; the fast-sealift ships (SL-7s); the RRF; etc.
Political permissions:	Overflight rights, basing rights...
Economic actions:	Freezing funds, closing out lines of credit, imposing specialized or general embargos, boycotting...
Command relations:	Unified commands, coalitional commands...
Higher-level operations:	(Drawing on the now-obsolete problem of Central Region defense) Deploy to the General Defense Plan positions along the inter-German border, conduct a limited fallback to the Weser River in the Northern Army Group, cover the Austrian corridor with a combination of French and German forces, shift some U.S. forces from V and VII corps to the weaker Belgian sector...
Hierarchichal theater-level campaign plan:	A plan may break into phases, each of which has multiple moves, each of which involves...
Strategic moves in crisis:	Various flexible deterrent options (FDOs) to show concern, resolve, preparation for conflict, etc.
Tasks:	*Assaulting and capturing a lightly defended airfield; conducting an amphibious operation; taking a hill; destroying key air-defense radars as part of a SEAD operation...*

Figure 4.6—Dimensions of Building-Block Planning

working on problems that are much smaller and easier than a major regional contingency.

Building-Block Planning in the Current System

The present system uses some building-block concepts explicitly, others implicitly, and still others not at all. It uses "force modules" (FMs) that include "complete combat packages made up of C, CS, and CSS forces in addition to some nonunit cargo and personnel" (Purple Book, p. 6-42). These force modules are available in a Force Module Library and are accessible through the Force Module Subsystem (FMS), "an interactive computer system that allows the planner to seek FMs that are either already built and maintained by the Services or built by the CINC during prior OPLAN creation" (Purple Book, p. 6-43).

It is less clear whether the current force module building blocks are adequate. Are the modules of about the right level of aggregation—

big enough to speed crisis planning, but not so big as to limit flexibility? Are they finely tuned to apply only to the relatively few points in scenario space considered by the present planning guidance, or do they have broad application? Are there enough of them and are they hierarchically structured? Because the present system does not include a routinized way of testing the crisis planning process over a wide range of situations in scenario space, there is no empirical basis for knowing. Thus the present system is increasingly applying building-block techniques, but it lacks an overarching doctrine and effective testing in realistic crisis-planning exercises.

The Special Problem of Support-Related Building Blocks. It seems to be a consensus among analysts and planners with whom we have discussed these matters that the current planning system has done a particularly poor job over the years in defining building-block *support* requirements. This, however, is extremely important, because establishing support requirements is one of the most difficult and time-consuming challenges in operations planning. The challenge is difficult because support tends to be highly disaggregated (e.g., at company and battalion level), and highly scenario dependent—i.e., dependent on the geographic environment, the nature of combat, and planning factors that may be based on points in scenario space far away from the one of concern.

Meeting this challenge is exacerbated by what would seem to be a generally conservative approach among support planners. In Desert Shield, for example, there was a substantial difference between what doctrine estimated was required for support and what was actually sent. Figure 4.7 shows the results of this experience measured in terms of personnel.[34] It shows that by day 70 of the deployment, there was a difference of almost 100,000.

Unfortunately, the consequence of conservative support requirements is that deploying unnecessary support delays arrival of combat

[34]This chart is based on analysis done by colleague Ron Sortor. Doctrinal estimates were those generated by the FASTALS (Force Analysis Simulation of Theater Administrative and Logistic Support) model used by the Army to determine support requirements. The differences between actual and estimated personnel support are explained in part because Operation Desert Shield needed fewer combat service units due to existing mature in-theater support, and fewer engineers and transportation units due to existing infrastructure.

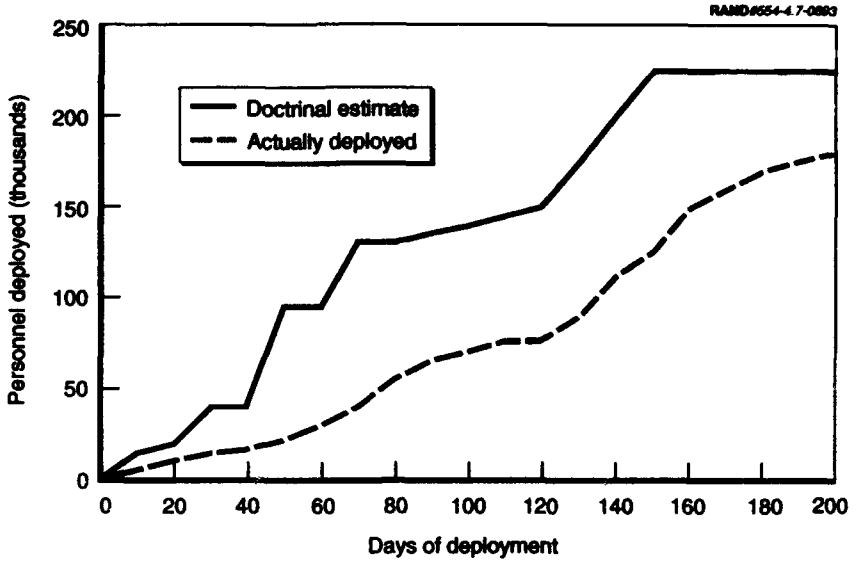

Figure 4.7—Desert Shield Personnel Deployed: Actual Versus Doctrinal Estimates

forces. Figure 4.8 illustrates this for a typical Persian Gulf scenario.[35] Standard doctrine suggests, for one lift unit (e.g., measured in millions of square feet for sealift) of combat force, about 2.0 units or more of support are needed. But if this support/combat lift ratio were 1.5:1, the closure of the lead heavy division might be moved up by a week. Reduction of the support requirement to a ratio of 1:1 might improve closure by nearly an additional week.[36] The

[35]Results in Figure 4.8 are merely illustrative. They are based on calibrations to Operation Desert Shield Phase I lift, unit closure dates as reported in Kassing (1992, pp. 22, 39), an assumed support-to-combat lift ratio in Desert Shield of 1.5:1, and judgments about how lift would have been allocated in other cases. Closure times do not scale linearly with the support-to-combat ratio because the productivity of sealift varies with time as packets of ships become available, deploy to the theater, return empty to the U.S., and deploy again.

[36]Support requirements are, of course, highly dependent on the particulars of the scenario under consideration. One important factor the authors believe is often neglected in determining support needs is the level of support available to threat forces. A reasonable hypothesis is that Third World adversaries, while they may spend much on combat equipment, invest little in support. Further, the U.S. potential to

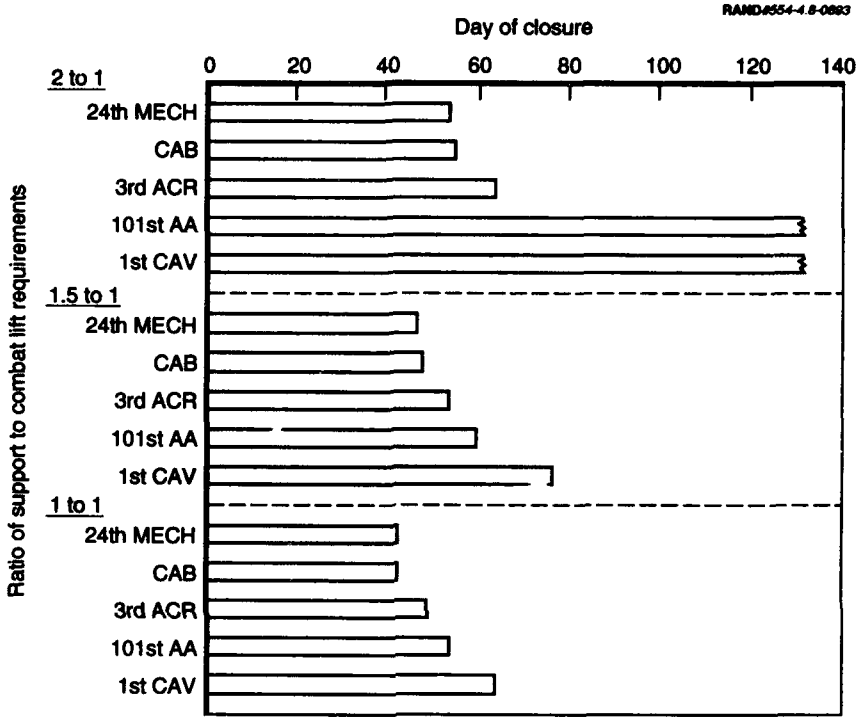

Figure 4.8—Closure of Ground Combat Forces in Theater Versus Support Life Requirements

cost of buying such a week with additional airlift and sealift runs into the billions of dollars.

In sum, the present system has an elaborate means of defining tooth-to-tail relationships and deployment planning factors for standard scenarios, but is weak in testing them or in providing for the diversity of potential scenarios.

There is nothing exotic about the building-block approach. Indeed, it is what good crisis-action planners find themselves doing natu-

render ineffective this support through deep fires is high. If this is correct, then the time and depth over which these countries can sustain intense combat in armor maneuver warfare should be very limited. This in turn should have a major influence on reducing the support needs of ourselves and coalition partners.

rally. Nonetheless, it is very different from refining and optimizing a monolithic operations plan over a period of many months, and then merely postulating that it will be possible to modify the plan as necessary in times of crisis.

We recommend the following on building-block methods:

Recommendations

— The Joint Staff and CINC planners should be seen as at-the-time *assemblers* of plans.[37] The Joint Staff planners should see themselves in this connection as *strategic* assemblers.[38] This will require them to standardize and exercise building-block concepts in the many dimensions indicated in Figure 4.6.

— The Joint Staff should be structured and staffed accordingly, and should be postured to work efficiently in real time with CINC planners in doing so.

CINC planners have inherent difficulties dealing with the orchestration of political, military, and economic instruments. They also have inherent difficulties anticipating and reacting to the many subtle concerns of policymakers in a particular fast-moving crisis. Thus, the Joint Staff should not be bashful about playing a larger role in plan assembly (this might require some new interpretations of Goldwater-Nichols guidance). The need for a strong Joint Staff role is surely understood in crisis-action planning, but it is not reflected in the more deliberate processes, at least as we understand them.

— The Joint Staff should take the lead staff role, under NSC auspices and with strong participation by the Department

[37]As discussed in Chapter Three, the conflict between the at-the-time assembly approach and the approach of preplanned options is partly semantic and partly a matter of degree. Many of the preplanned options discussed recently by the Joint Staff and CINCs are, in our terms, building-block operations that can be executed or not at the time. However, we think it is possible and important to go much farther than we believe has been done so far in developing building-block flexibility and the teams to do specialized option tailoring *quickly* when the time comes.

[38]This section on building-block techniques expands upon material presented as a briefing earlier to the J-5 staff by Davis and RAND consultant Paul Bracken in 1991 and early 1992.

of State, in planning ways to coordinate the effective use of political, economic, and military instruments such as FDOs. It should assist other agencies in learning how to standardize and test such flexible deterrent options in exercises. It should take the lead in assuring appropriate communication links to permit coordination in times of crisis.

— The Joint Staff should lead (delegating staff work to commands such as USTRANSCOM in some instances) in the development and standardization of *discriminate support-package building blocks* (e.g., packages discriminating among situations varying in such factors as type of conflict, probable intensity and duration, terrain, length of LOCs, infrastructure, and commander capability to limit combat and consumption if necessary) and related planning factors.

Analysts and wargamers, and sometimes operations planners, have long had to deal with such issues without the benefit of such discriminate official planning factors.[39] They have resorted to heroic assumptions such as postulating an "initial support increment" and a "follow-on support increment," and by postulating magnitudes for each (e.g., that the former might be half of the total). During the Cold War, there was organizational resistance to providing official figures on such matters, partly out of fear that civilian planners would quickly decree that the "initial" support increment was adequate because war would "surely" be short. Such arguments are not persuasive today. If we want to have adaptive planning, planners must be able quickly to estimate support requirements for a wide variety of situations.

ORGANIZATIONAL DECISION-SUPPORT SYSTEMS

The last component of Figure 4.1 is improving tools, i.e., developing strong organizational decision-support systems.

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[39]Some horror stories on this were reported to us by CENTCOM staff recalling the difficulties they had making mobility estimates early in Desert Storm. Lund and Berg (1993) documents instances in which airlift productivity was hampered by operations planners not understanding the assumptions that underlay standard planning factors.

Inadequate Data Processing and Decision Support

Producing quick operations plans is critically dependent on automated data processing (ADP) support—hardware, software, data displays, communications links, and skilled operators. The criterion for effective ADP support, given the basic nature of the security problems we may face, should center on its ability to adapt very quickly to the particulars of complex and uncertain crises as they emerge. The ability of ADP support to meet this criterion needs to be measured through realistic testing.

At the time of the Gulf War, ADP support did not meet this criterion. According to the DoD report to Congress on the Gulf War (Department of Defense, 1992) and many military officers with whom we talked during the course of this study, initial transportation planning was done *manually* (often with substantial errors due to the absence of appropriate tools and aggregate data bases). The JOPES system, which was to provide automated support, did not begin functioning as designed until after the third week in August and, even then, was poorly regarded by most participants. A quickly constructed DARPA prototype (DART) proved, by contrast, to be highly attractive and useful as a man/machine interface. The report cites three reasons for problems with the use of JOPES: (a) absence of necessary deployment data; (b) the decision by CINCCENT to make repeated changes in a TPFDL that wasn't well baselined in the first place, varying the priority and the scheduling of unit movements in midstream; and (c) a shortage of trained operators (Department of Defense, 1992, p. 3).[40]

Those of us familiar with modern computer technology, including wargames and related computer simulations, and familiar as well with modern organizational decision support systems, draw a somewhat different and more starkly negative conclusion.[41] In a nutshell,

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[40]Another problem reported to us by staff at the commands was that security restrictions denied critical information to the people being tasked to do logistics calculations, including timeline estimates.

[41]See, e.g., Carter et al. (1992) for discussion of modern organizational decision support systems. One example of a highly interactive and flexible modern wargame is the RAND Strategy Assessment System (RSAS) used at the war colleges and RAND (see, e.g., Bennett, 1992).

the JOPES system represents obsolete technology and obsolete mind-sets. The JOPES design predates the breakthroughs of highly interactive computing and was driven by the "data processing community" rather than analysts or experts in decision support. To illustrate differences in mind-set here, modern wargames, simulations, and decision-support systems are designed to maximize the user's ability to change assumptions and to explore "What if?" questions. Some also provide tools for finding "optimum" solutions to problems or for at least finding solutions known to work. By contrast, with the JOPES system it was relatively difficult even to make changes in the TPFDL—the very thing that an adaptively oriented analyst would identify as being particularly important to change![42] The JOPES system is also thin on planning aids.

Distributed Interactive Simulation and Wargaming

There are great opportunities emerging here, because modern technology is making possible *distributed interactive simulation* (DIS) in which participants in exercises can be spread over the globe, some using computer models, some using man/machine simulators, and some conducting field operations.[43] Distributed wargaming is becoming a necessity as well as an opportunity, because it is no longer politically or economically feasible to conduct frequent large-scale exercises in populated areas or to disrupt commercial activities for large-scale deployments and maneuvers. Furthermore, more forces are being demobilized and budgets are shrinking rapidly.

In many respects, such exercises are actually superior to field exercises. Computers, after all, allow one to examine the many "What ifs" that come to mind whenever one considers results from a "live" exercise. Further, computer models are sometimes extremely useful for integrating—i.e., for seeing the whole forest amidst the plentiful trees. At the same time, the current state of distributed wargaming is relatively immature, and many problems continue to exist. One widespread problem is the tendency for exercises and related computer models to become extremely detailed and complex, so much so

[42]Work on the JOPES system has recently been halted by DoD direction.

[43]For discussion of DIS and some of its problems, see Defense Modeling and Simulation Office (1992), Bankes (1992a), and Davis and Blumenthal (1991).

that they cannot be used to explore alternative scenarios. And, often, they are only partially comprehended by participants. As often happens with new technology, DIS has been oversold by some of its enthusiasts. Many of the most important functions of computerized games and simulations will best be accomplished by *non*distributed systems with which analytic staffs are totally familiar and over which they have complete control. This is especially important where models must cross levels of resolution and cut across service and other boundaries.[44]

Distributed Information and Communication Systems

Quite aside from simulation and wargaming, modern technology now makes it possible to completely rework the way in which the Joint Staff works with the unified commands and other organizations. In particular, we have in mind distributed information systems. As we reported to the J-5 in the course of our study (in work by colleague Robert Anderson), current staffing procedures are archaic and inefficient. We envision *near-term* information systems that would allow, for example:[45]

- Disseminating drafts of major planning documents (including graphics) electronically to all relevant recipients, with turnaround times measured in hours (or, more typically, days).
- Collecting comments and suggested changes in electronic form, and generating automatically reports showing those changes in standard form.[46] Turnaround times could be minutes or hours, rather than weeks or months.

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[44]See Davis (1993a), which is based on work done for ARPA, for introductory discussion of the *substantive* difficulties (as distinct from difficulties in making models "run") associated with connecting models that were not designed together and the advantages of designing from the start for variable-resolution models or families of models.

[45]Radically ambitious ideas for "ultimate computing and pervasive communications" are under study by RAND colleagues Robert Anderson, Tony Hearn, and Bruno Augenstein. The work is being sponsored by RAND internal funds and by ARPA.

[46]Users of Macintosh computers already have access to a commercial software package called DocuComp, which compares before-and-after manuscripts and generates change reports with additions underlined, deletions scored through, and passages that have been moved shown in bold.

- Routine use—by staffs, not merely commanders—of video-conferencing supplemented by workstations and netted data bases.

Our recommendations in this area should be clear:

Recommendations

— Start fresh in designing the necessary tools, drawing heavily on the recent technological revolutions and on recent work on the theory of organizational decision support.

— Exploit modern, highly active wargaming and simulation, including distributed wargaming and simulation.

— Modernize information systems to permit state-of-the-art video and computer communications among staff officers doing planning at the Joint Staff, commands, and elsewhere.

Doing well on these matters may require making exceptions in the usual acquisition processes, since information technology is changing rapidly and commercial products are often state of the art.

IMPROVING RELATIONSHIPS AMONG STRATEGIC, PROGRAMMATIC, AND OPERATIONS PLANNING

So far in this chapter, we have discussed improving the elements of operations planning. Let us now turn to one of the principal themes of the report, improving relationships among types of planning (and types of planners).

The Current System and Its Problems

This is not the place to describe the current strategic planning system in all its details, much less to design a comprehensive and detailed replacement. Instead, we shall restrict ourselves to selected observations and recommendations. With this in mind, Figure 4.9 depicts the current overall system in relatively simple terms. Note that the crisis-action planning occurs only in crisis itself. Otherwise, opera-

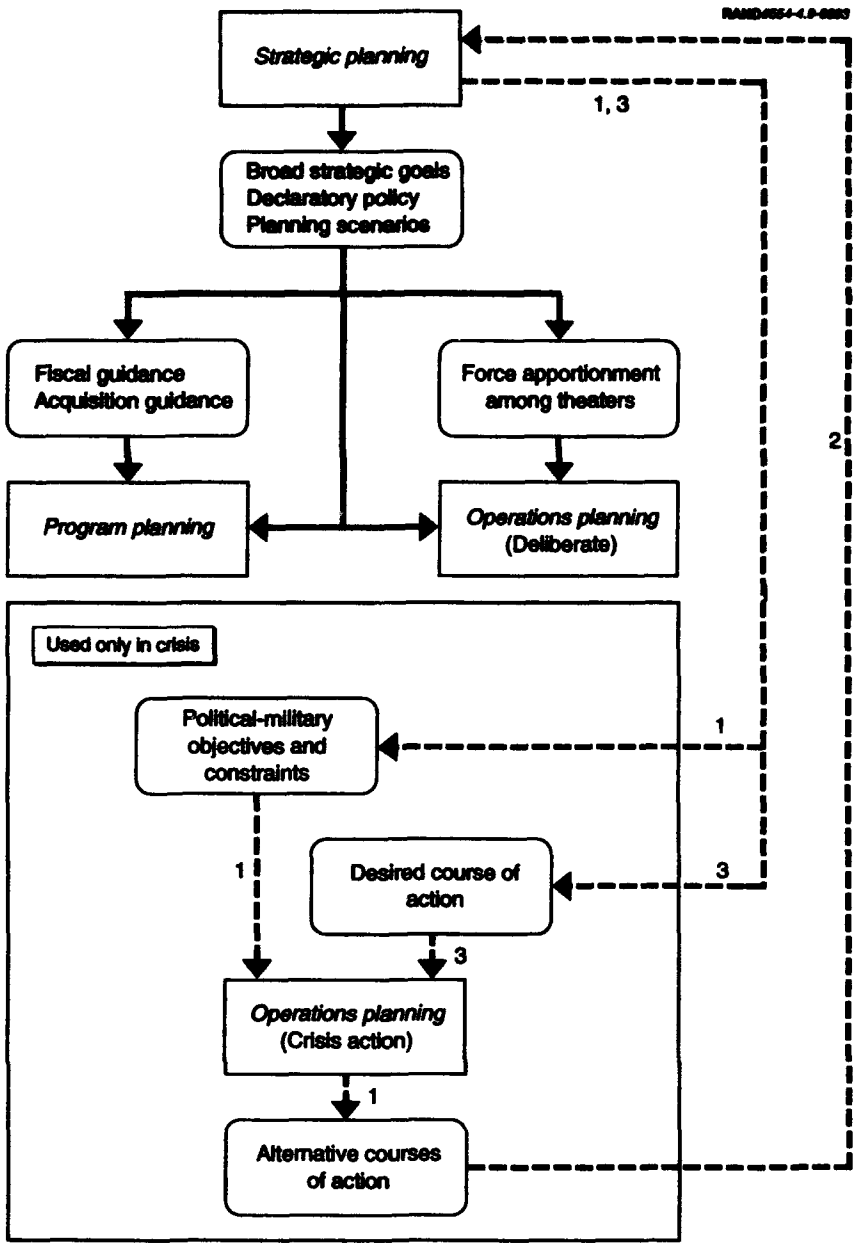

Figure 4.9—The Current Strategic Planning System

tions planning is represented by the deliberate planning process described earlier in the chapter.

Figure 4.10 is a highly simplified and notional depiction of the relationship between the Planning, Programming, and Budgeting System (PPBS)[47] and the Joint Strategic Planning System (JSPS), which is being streamlined. We do not show the information flow, but there is a great deal of it. Blocks show periods of time during which documents are prepared; final versions are issued at the end of that period. The Office of Management and Budget (OMB) issues tentative fiscal guidance, which affects the SecDef's work on the Defense Planning Guidance (DPG), as does input from the Chairman's Joint Strategy Review. The military departments (the services) develop their tentative programs and report them in Program Objective Memoranda (POMs), following DPG guidance. As needed, the Chairman issues a Joint Strategic Capabilities Plan (JSCP) to guide operations planning by the CINCs. The JSCP reflects the DPG and (not shown) the Planning Guidance for Contingency Planning Guidance. The Chairman and the Secretary review service POMs and, where issues are raised by their staffs, the Secretary resolves them with Program Decision Memoranda (PDMs), after which the services revise their programs and submit budgets. The SecDef adjusts those programs somewhat (primarily through Comptroller actions), and the result emerges as part of the President's budget.

As in all systems involving individuals and institutions, in practice the system often does not work as it is formally set out. At the same time, formal structure is important. Informal arrangements may not be stable over time and cannot be relied upon as enduring instruments of policy. And the construct of formal institutional relationships is a powerful means leaders have to set priorities. With that background, and taking Figures 4.9 and 4.10 as representative, we make the following tentative observations, without the benefit of having worked within the Joint Strategic Planning System ourselves:[48]

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[47]See Lewis, Roll, and Mayer (1992) for discussion of the PPBS system. The Purple Book is no longer current.

[48]For more detailed discussion of these matters, see Lewis, Roll, and Mayer (1992). It describes the process of establishing the "Base Force."

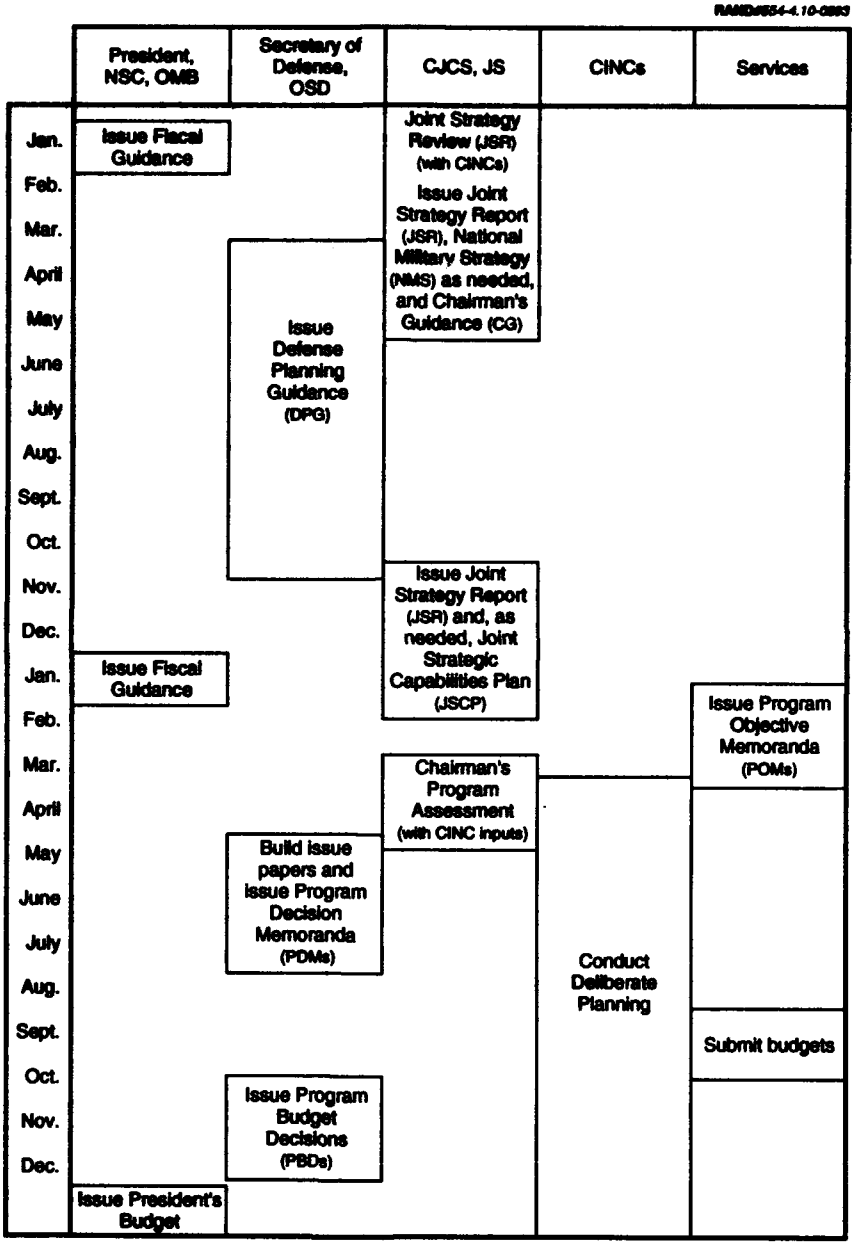

Figure 4.10—Simplified View of the PPBS and JSPS

- Crisis action planning is disconnected from the normal strategic and programmatic processes, coming into play only when actual crises occur. Deliberate planning is the only representation of operations planning in the formulation of strategy and programs. As we have noted, deliberate planning is "deliberate," focuses on development of operations plans, and is not conducted so as to emulate crisis operations.
- There is no *direct* communication of the insights from operations planning to civilian strategic and programmatic planners (or to service planners). Instead, insights are conveyed to the Chairman and Joint Staff. The Chairman and his staff pass on key insights through the National Military Strategy, the Joint Military Net Assessment, participation in the PPBS process (e.g., Defense Resources Board), and informal channels such as briefings of analytic work conducted by the Joint Staff. But the present system has no formal vehicle to inject directly learning from operations planning into either program or strategic planning.[49]
- There is no evident linkage that would allow program planners to test program options in the operations planning process. To be sure, the Joint Staff conducts comparable testing as background for the Chairman's Net Assessment and the Chairman's program assessment. The linkage, however, is not what it could be.[50]
- There is no formal vehicle to allow crisis decisionmakers—the President, Secretary of Defense, and their immediate advisers—to practice crisis decisionmaking and its implementation with the operations planners.
- There is no formal, routinized process for the President and his immediate advisers to give broad strategic guidance to shape planning for contingencies. While that might be quite reasonable if only the DoD were involved, it is not so reasonable when

[49]A partial exception here is the link through the Assistant Deputy Under Secretary for Policy (Plans). This link was created as the result of the Goldwater-Nichols Act, which specified that the Secretary of Defense should review operations plans.

[50]One valuable mechanism for such work in the 1980s was the Total Force Capabilities Analysis (TFCA) conducted by the Joint Staff's J-8. That work, however, supported the Chairman's assessments and was not actually a part of program development per se. Also, the TFCA process was able to conduct only limited sensitivity analyses because it depended on human-intensive gaming.

one recognizes that real-world contingencies require coordination of political, economic, and military measures.[51]

- More generally, the picture is one of highly compartmentalized planning.

Overview of a More Integrated Approach

Figure 4.11 indicates schematically the components of an approach that would increase substantially the degree of integration among types of planning and planner. The diagram deals only with contingency planning and not with such other important issues as long-term competition, counterproliferation policy, and arms control.[52]

National Security Planning Guidance

We have seen, in this and the preceding chapter, that contingency planning should involve an orchestration of political, military, and economic instruments within the frameworks of strategy. The Joint Staff has recognized this and is now requiring CINCs to identify some of the political and economic measures that would be most useful in dealing with contingencies in their regions. In the last two years there has also been an increase in the number of cross-agency meetings dealing with such matters. From an organizational viewpoint, however, the U.S. lacks something here.

We recommend the following:

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[51]As the Purple Book, p. 5-4, notes, Presidential decisions are communicated by intelligence findings, National Security Decision Directives (NSDDs), etc. While these instruments could be used to inject White House guidance into the PPBS/JSPS with timing coordinated with the two-year planning cycle, they generally do not do this. The only White House guidance routinely given the planning process is Fiscal Guidance from OMB, although some is provided by NSDDs and related documents.

[52]Our point here is that in this report we are excluding some very important strategic subjects that affect long-term strategies, programs, and policies. Contingency planning covers a major part of national security planning, but only a part. For example, it does *not* really cover the challenge of discouraging other powers from aspiring to superpower status by building up their military capabilities. Nor does it deal directly with the important issue of *perceptions* about military and other power. Those perceptions may be related to actual warfighting capabilities for specific contingencies, but they are often shaped by a different set of variables, including bean counts, military presence, and research and development demonstrations.

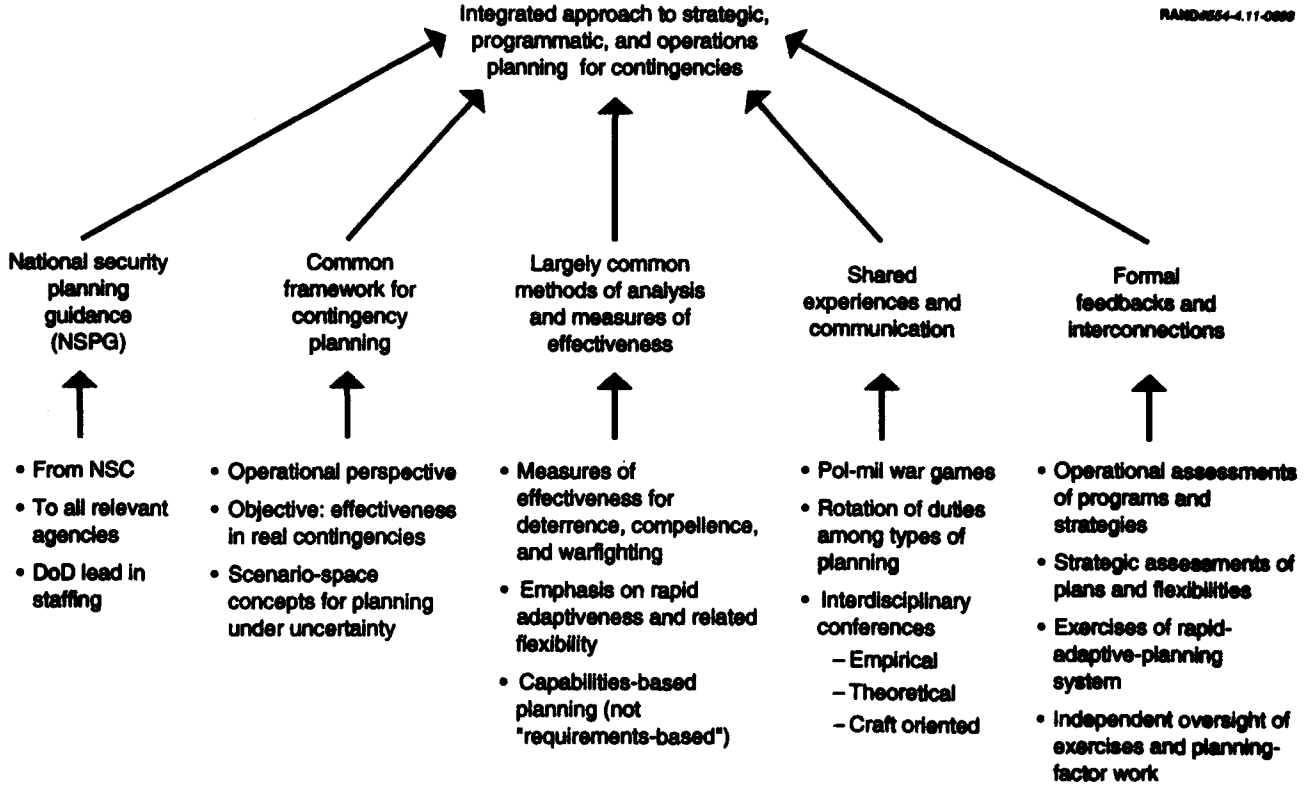

Figure 4.11—Components of Integrated Contingency Planning

Recommendations

— The NSC should have an even larger function than it does now for developing and issuing national-security planning guidance and facilitating both planning and training for effective national-level crisis action.

— All relevant agencies should have full-time staffs devoted to such contingency planning, and such assignments should be rewarding and career enhancing.

— The DoD should have the lead role in staffing contingency planning and in developing the appropriate operational decision support systems, training programs, and exercises (only the DoD, and indeed the Joint Staff, has the requisite organizational skills and infrastructure).

A Common Intellectual Framework

If there is to be successful cooperation among agencies on this matter, and among the various types of planning within the DoD alone, it is necessary that there be a common intellectual framework within which to reason and communicate. In this report we have argued that this framework should have an "operational perspective" (albeit with different time scales, specificity, and experimentation for operations, strategic, and program planning). That is, the overarching objective is to assure that the U.S. has—now and in the future—excellent capabilities for rapid, adaptive, and effective response to contingencies. This requires physical capabilities, diplomatic and other relationships, and—importantly for this report—rapid-planning capabilities for real-world contingencies with all their subtleties, complexities, and uncertainties.

We recommend here that:

Recommendations

— Discussion of contingency planning should be conducted using the concepts and terminology discussed in Chapter Three (planning under uncertainty, scenario space, desired envelopes of capability, regions of assured capability, regions of highly uncertain capability, programs to "push

back the envelope," multiscenario analysis, and appreciation of flexibility).

Largely Common Methods of Analysis

Each type of planning (strategic, programmatic, and operations) must necessarily have its own methods of analysis to some extent. In a given real-world contingency, for example, the ability to maintain secrecy about the role of one or another ally may be crucial in evaluating alternatives. It is unlikely that program planners would find it useful to try to worry about such matters for the distant future. On the other hand, program planners are very interested in the time profiles of both total obligational authority and outlays, while those may be of no interest to operations planners so long as the desired capabilities show up in a reasonable period of time.

Even though there are many such special issues in the various types of planning, we believe it is possible for methods of analysis to be *largely* (or at least quite significantly) common. This follows from our emphasis on using operational capability in real-world contingencies as the key to contingency planning overall. If operations planners consider it exceptionally valuable to have a particular type of flexibility, even if that doesn't show up in the "standard" scenarios, then program planners should adapt their thinking, not vice versa. The upshot here is the following:

Recommendations----------

— We recommend methods of analysis along the lines described in Chapter Three for planning under uncertainty. These include:

  - Multiscenario analysis in its broadest sense.
  - An emphasis on capabilities analysis (including estimates of marginal impacts) rather than requirements analysis.
  - Measures of effectiveness such as "stoplight colors" over a broad range of scenarios or "how far back we can push the envelope" in a more continuous representation of capabilities.

Shared Experiences

As a practical matter, one of the most important mechanisms for accomplishing our integration goals is to assure that each type of planner is exposed to the others well enough to understand and appreciate them (and the other planners). Operations planners should have experience in making objective resource-allocation decisions that take a joint perspective within the DoD world and that consider tradeoffs between defense spending and other federal spending (or tax cuts). Program planners should have experience seeing how operations planning is conducted. They should have extensive opportunities to visit military facilities and field units to better appreciate what otherwise might be abstractions. All of the planners (but especially strategic and program planners, who often have less sense of history in this respect) should be exposed to empirical information, both anecdotal and scientific, on what goes wrong in real operations and why hedges are important.[53]

The fortunate ones among current planners already get some opportunities along these lines. The authors, for example, have over the years had richly rewarding opportunities to talk in depth with CINCs and their senior planners in the field. And some of the most senior general officers (including General Powell) have served in all kinds of planning positions. Overall, however, there is no program to assure that such things happen. There is no concept in OSD, for example, of "educating" civilian analysts in military operations, or of assuring that they get appropriate exposures.[54]

There are many methods that could be employed to more systematically assure shared experiences of the right sort. Some of these already take place from time to time, but without the benefit of anything like textbooks or training courses for civilians learning about military operations. Similarly, we believe that military officers often

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[53]One suggestion made by a reviewer is that OSD should consider having a civilian staff college to facilitate acquainting civilians with military issues and realities. A partial analog might be the Army's management college at Ft. Belvoir.

[54]By contrast, the services have taken seriously teaching "civilian issues" in their war colleges and the National Defense University. Foreign visitors are often surprised and impressed by the relative sophistication of senior American officers with respect to political, international, and defense-planning issues.

have inadequate education in methods of analysis, especially analysis under uncertainty, and that their sophistication as consumers of analysis varies enormously. This is especially important as we become more dependent upon computer-intensive wargaming, distributed interactive simulation, and other uses of models and simulations.[55]

As suggested in Figure 4.11, we recommend an explicit program to assure appropriate gaming, modeling, rotations of assignment, and interdisciplinary and cross-functional conferences. The institutions already exist to carry out such a program (e.g., the National Defense University, the political-military gaming unit of the J-8, and the Military Operations Research Society). What is needed is the program itself. Our own view here is that:

Recommendations

— The Joint Staff should take the lead in sketching such a program to create shared experiences and bringing together the relevant offices to discuss and iterate upon it. The Chairman should then suggest to the Secretary a study to formalize a plan of action.

— The Joint Staff and the Office of the Secretary of Defense should jointly sponsor a permanent program of activities based on the recommendations.

Formal Feedbacks and Communications

The last component of our proposed approach to improving the integration of strategic, programmatic, and operations planning involves establishing *formal* links to assure normal communications, including feedback. Our thinking here is based on the following observations:

[55]A worrisome problem in this regard is that much more high-level DoD attention seems to be focused on connecting and netting diverse models and simulations than on understanding and improving their treatment of military phenomenology and their usefulness as aids to decisionmaking under uncertainty. For laments on this score, see Davis and Blumenthal (1991).

- Operations planners (or, more precisely, people doing the kind of analysis we associate now only with operations planning) need to describe to strategic planners the envelope of coverage feasible with current and future forces to preclude gaps between national strategic policies and military capabilities.
- Operations planners need to alert program planners to gaps in coverage of scenario space directed by strategy to help set program priorities, and to help program planners evaluate options to fill these gaps.
- Strategic planners need to set out for operations planners the desired envelope of coverage in scenario space and, in particular, the strategically most important regions within the envelope, including some that are extraordinarily difficult to deal with.
- Strategic planners need to give tentative guidance to program planners on how future programs should reshape the coverage envelope in scenario space, and on the future resources available to accomplish this.
- Program planners need to provide strategic planners with assessments of the feasibility of such programs and the costs associated with them.[56]
- Program planners need to suggest program options to operations planners for testing of their contribution in real-world plans for the application of military force.

The information flow among these planners should not be one-way, nor strictly top-down or bottom-up. Overall, we need a process of adaptive shared learning among all participants. It should involve structured feedback loops that continuously refine understanding of the complexities of scenario space, of our envelope of coverage in it, and of how best to cope with it within available budgets.

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[56]Realistically, people often are not neatly identified as strategic, program, or operations planners. As a practical matter, some strategists are in program-building offices, some operations planners are more strategically oriented than others, and so on. Also, individuals often fulfill different functions from one period to another in their careers (or even from one week to the next). A primary example here are the Crisis Action Teams (CATs) drawn by the Joint Staff's J-3 from diverse offices.

How might this be accomplished? As background for our suggestions, recall that earlier in the chapter we argued that the deliberate planning process should be eliminated in favor of a new process that would focus on developing the capability for rapid adaptive planning at the time of crisis. Personnel in this system would spend some time developing detailed baseline plans, a great deal of time doing sensitivity analysis and problem exploration, and considerable time training or exercising crisis-planning capabilities under realistic conditions.

We recommend the following:

Recommendations

- Operations planners would rotate among assignments involving near-term operations planning and operations-planning-style assessment of possible future capabilities that might be included in the defense program.
- The latter assessments should be conducted in an activity sponsored by the Secretary and Chairman jointly. It would involve military planners, civilian analysts from OSD, and in some instances, other agencies.[57] It would be managed by the Joint Staff so that activities could readily involve appropriate personnel from the CINC staffs, using methods, software, and equipment relevant to crisis-action planning where appropriate. Some of these activities might be supported or supplemented by FFRDC efforts.
- The Joint Staff should consider defining documents to be produced routinely from this activity to be part of the Joint Strategic Planning System, PPBS, and DoD participation in the postulated NSC-level activity on cross-agency contingency planning. Alternatively, it might define a process

[57]Some readers with long memories will note similarities to the concept of an in-government Strategic Assessment Center proposed a decade ago. See Davis and Winnefeld (1983) for discussion of those ideas, including government intentions at the time. What emerged was an analytic wargaming system (the RAND Strategy Assessment System or RSAS), which is used extensively in the war colleges and for quite a number of studies. The more sophisticated studies, however, have been conducted by RAND (for a variety of OSD, Joint Staff, and service sponsors), rather than in the government itself.

that would identify each year key reports to be developed over the next two years.[58]

— In organizing particular activities, the Joint Staff should consider adopting a task-force framework suggested in Figure 4.12 (adapted from unpublished work by colleagues Glenn Kent and David Thaler; see also Kent and Simons (1991)).[59]

This framework employs teams of people that break down as shown into worriers, conceivers, technologists, and so on. The "conceivers" are people such as operations planners, who are able to solve mili-

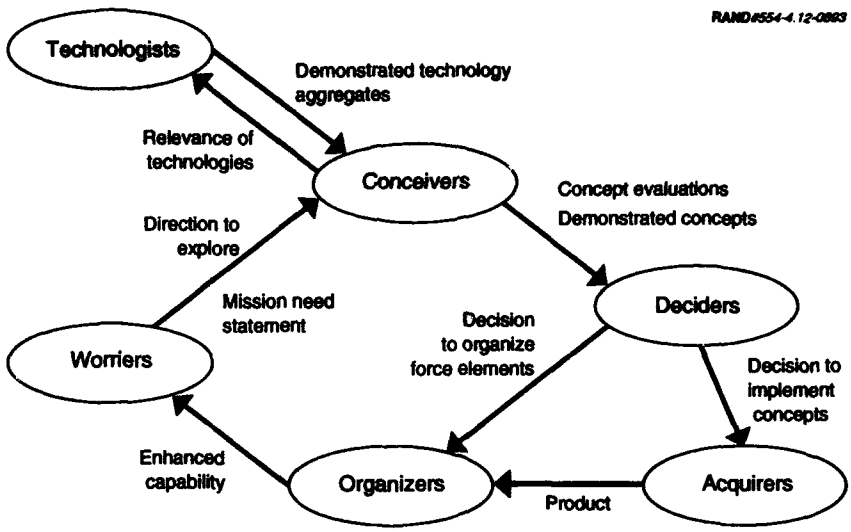

Figure 4.12—A Proposed Process for Cooperation

[58]The studies at issue here might range widely in character and might include items that were somewhat comparable to such older documents as the annexes of the Joint Strategic Planning Document, the Strategic Mobility Requirements Study, the reports on TFCA analyses, the congressionally Mandated Mobility Study, and various regional studies done in OSD (PA&E).

[59]This framework is quite powerful and is being proposed by our colleague Glenn Kent as an organizing principle for restructuring the way in which the DoD approaches both R&D and acquisition.

tary problems identified by the "worriers" (e.g., analysts and mid-to-long-range planners from the services, Joint Staff, CINCs, OSD's Office of Net Assessment, and FFRDCs) by constructing notional campaign plans (concepts of operations) that would employ capabilities proposed by the "technologists." Such concepts would be evaluated with analysis and gaming (including, perhaps, complex distributed wargaming). Where they proved attractive, they would be picked up by those who build and manage programs, and eventually by the operators who would use them. From the start, however, the activity would include representatives of all types of planning.

The Role of Analysis

To complete this chapter let us discuss briefly the ubiquitous role we see for analysis in defense planning. Figure 4.13 may look at first glance like a standard top-down planning diagram. Upon inspection, however, note that analysis plays a pivotal role at all stages. Indeed, even the initial top-down guidance must (or at least should)

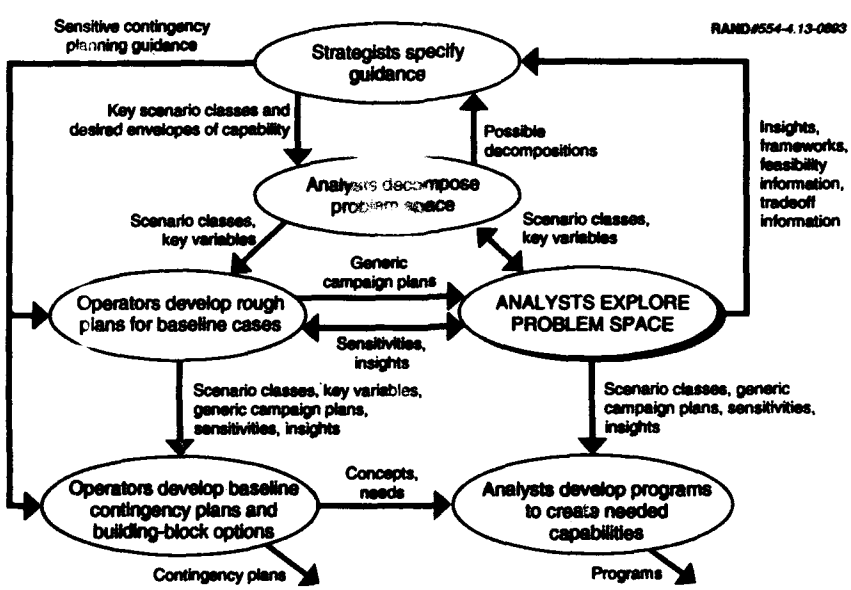

Figure 4.13—Role of Analysis

follow initial analysis to decompose the scenario-space problem into workable pieces of greater and lesser importance. The reason we end with this diagram is that in our image of post–Cold War defense planning, there should be a great deal more multiscenario analysis and a great deal less in the way of arbitrary or semiarbitrary "requirements" and point scenarios. In our vision, the information flowing from one type of planner to another is rich, sophisticated, and framed to deal well with uncertainties of all kinds.

Chapter Five

IMPLEMENTATION ISSUES

The planning system proposed in this report would be a revolutionary change from the current system. Because of this, many may be reluctant to accept its required shift in mind-set. And beyond that, successful implementation would require major shifts in institutional power relationships that often are the downfall of the best-laid plans. Given these realities, a useful place to begin discussion of implementation strategy is to consider the fundamental roots of resistance to change in defense planning, and to assess whether and how they might be overcome.[1]

ROOTS OF RESISTANCE TO IMPLEMENTATION

Diplomatic Delicacy

Historically, the necessity for diplomatic delicacy in defense planning has probably had a major role in what was planned for and how planning was carried out. For example, our Cold War strategy was premised in large measure on peacetime political cohesion among ourselves and our European partners. Our declaratory policy was largely designed as an instrument to this end. It produced concepts such as simple, monolithic scenarios that were symbols of a stable diplomatic bargain and operational plans premised on this bargain, which seemingly ignored the basic principles of the operational art.

[1]Appendix C draws upon business experience with organizational learning to discuss other aspects of implementation strategy, notably those that are more directly under the control of the Joint Staff.

Even after the Cold War, diplomatic delicacy has continued to play a role. In the early phases of Desert Shield, for example, there was strong Saudi pressure for initial U.S. forces to defend forward at the border with Kuwait (reminiscent of forward defense in Europe), even though that would not have made sound operational sense and left these forces highly vulnerable (Department of Defense, 1992, p. 42).

A first consequence of having operations planning driven by the necessities of diplomacy was to produce strategic, programmatic, and operations plans that might have proved inflexible and ineffective in time of crisis and war. A second consequence was a planning process that avoided experimenting with variations from standard scenarios, lest these variations be taken as a diplomatic symbol of a shift in American policy or fissure in the cohesion of our alliances. A third consequence was the eschewing of realistic testing of the planning process to and beyond its breaking point. In the minds of some, such testing to failure might have lowered our own self-confidence and weakened deterrence.

Politics of Defense Planning

Another historical factor that has imposed constraints on defense planning involves the interaction of our national strategy—containment in the Cold War—with domestic politics. An essential ingredient in containment was a stable U.S. public consensus to commit very large fiscal resources to this strategy. A principal instrument for achieving this condition was emphasis (starting with NSC-68) on a simple but massive military threat to our most vital interests. The goal was creating an image the public could easily grasp and be compelled to act upon. This communication to the public contained little of the nuance of what was in fact vast uncertainty. As a political strategy it succeeded, but to the extent it drove the details of program and operations planning by unduly narrowing their focus, it had distinct shortcomings.

Power Relationships

A third historical root of resistance to change in defense planning involves organizational competition within the United States. The defense planning process and the instruments it used (e.g., planning

scenarios) were in part the forum and currency determining power relationships among U.S. institutions. Within the defense plans the process produced were found the arguing points for why we needed bigger or smaller defense budgets, more or less of this weapons system, and larger or smaller staffs for that institution. This occurred at all levels—the executive vs. the legislative, OSD vs. the Joint Community, service vs. service.

While the degree to which these power tensions influenced planning is unclear, it is a reasonable hypothesis that they were important. It certainly would seem to have put a burden on defense planning in general far beyond its up-front purpose. And with respect to crisis planning, it is easy to imagine why it might be relegated to obscurity, given its largely invisible connection to the power relationships at stake.

Civilian Access to Military Plans

A fourth potential root of resistance involves the longstanding military practice of severely restricting access by civilian leaders and their staffs to military plans. The motivation for these restrictions is in part to limit the possibility that, through press leaks or more nefarious means, these plans would be exposed to our adversaries. Clearly, our plans in the hands of the enemy would cost lives and perhaps the accomplishment of our objectives. In part, the restrictions may also serve to prevent at least public exposure to our friends, and avoid the diplomatic delicacy problem discussed above.[2] Prudent military planning may not always slavishly follow peacetime political constraints that may disappear in crisis and war. Finally, these restrictions are one of the instruments to regulated power relationships mentioned above.

Intellectual Inertia

Finally, designing defense planning systems for "flexibility" and "adaptability" is intellectually very hard. Even in the "simple" days of

[2]It has been noted that many aspects of the Defense Planning Guidance leak, whereas leaks from the Joint Strategic Capabilities Plan are extremely rare. The latter is subject to Joint Staff controls.

the Cold War, the viability of plans could be significantly influenced by hundreds of variables whose values in crisis or war were impossible to predict with much certainty. The more robust concept of scenario space introduced earlier in the report poses a problem of such complex dimensionality and variability that planners would not naturally gravitate toward coming to grips with it if they were not compelled to do so.

OVERCOMING RESISTANCE

Diffusing Diplomatic Delicacy

U.S. security strategy will continue to be dependent on coalitions. To be effective, these coalitions must be politically cohesive, which implies that we respect and accommodate to some extent the political and security interests of our partners—even when their interests are not coincident with our own or lead to nonoptimal military plans.

Given these principles, we will continue to have declaratory policies and operations plans that respect diplomatic delicacy. At the same time, we are motivated to have an operations crisis-planning process that can adapt to at-the-time circumstances. It might start with the politically acceptable baseline plan, but might need to develop quickly a radically different plan to match the actual situation. Having such a rapid adaptive-planning system would keep American and coalition leaders from being chained in crisis to inappropriate peacetime plans.

Sensible Defense Planning in the Swirl of Domestic Debate

Defense planning will no doubt be immersed in domestic political discussion and subject to its pressures for as long as the defense spending is a noticeable portion of the federal budget. Defense planning should contribute to that debate in providing reasoned information without being itself corrupted. At issue is how it might best do that.

An illustration of the dilemma defense planning faces in public discussion is the capabilities-based/threat-based forces debate in 1992,

the Bush administration being a proponent of the former, then Congressman Les Aspin (now Secretary Aspin) a proponent of the latter.[3] A problem with capabilities-based planning, if it were practiced in its pure form, is that requirements for capabilities would be stated as abstractions, seemingly assertions by defense planners of what they think we need, with no tangible ties to the "real" world. This may, given the uncertainty of threats we may face down the road, be quite justifiable. But it may not be effective in gaining congressional and public understanding and support.

The problem with threat-based planning, while perhaps effective as a political strategy, is that it does not account for the vast uncertainty in the threat it postulates.[4]

In the approach we propose, one that emphasizes scenario-space concepts and the need to plan for envelopes of capability under uncertainty, one can have the best of both worlds. We can talk about capabilities in the abstract—the desired envelope of coverage, leaving particular threats as just illustrative points in this space. For some purposes, however, the executive branch can present illustrative threats in the context of the scenario-space envelope as a means of giving the Congress and the public a more tangible sense of why the abstract capabilities are needed, and why they deserve resources.

Another dilemma defense planners face when caught up in the public debate is the worst-case/best-case assumptions trap. Too much optimism may produce plans that stir public enthusiasm at the prospects of victory and may bolster deterrence, but optimism may also undercut public support for resources and produce plans that are ineffective because they underestimate the challenge U.S. forces will in fact face. Too much pessimism may encourage more defense

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[3]The threat-based planning described by then Congressman Aspin is akin to the requirements-based planning we discuss in this report. Cheney's capabilities-based planning, however, is somewhat different from what we mean by that term in that, in addition to recognizing uncertainty, we emphasize assessing the desirability of a given program initiative with "marginal analysis," that is, looking at how much added insurance we obtain for the marginal dollar.

[4]As a matter of practicality, capabilities-based planning, as it is practiced, relies on specific plans for a relatively few scenarios that postulate very specific "threats." So currently perhaps there is little practical difference between the two. See also Winnefeld (1992) for discussion of such matters.

spending, but pessimism, if seen over time as unfounded, undermines stable public support. Further, too much pessimism may undercut deterrence by conveying a message to adversaries that we are not confident in our own ability to use force as an instrument of policy.

Here the scenario-space envelope concept may help resolve this dilemma. Under it, the relevant question is not the "right" degree of optimism or pessimism. Instead, it is how pessimistic (or optimistic) assumptions about scenario must be before we find ourselves outside (or inside) the envelope of capability. And what programs can allow us to handle more pessimistic assumptions?

In public discussion, this concept then turns to collective political judgments, not on whether a particular scenario is a sufficient basis to justify a defense program or budget. Rather, it is along the lines of what risks the public is willing to take versus the resources it is willing to commit to defense. It strikes the authors that this debate may more usefully serve the public interest, and in the end may secure more stable public support for defense resources.

A New Bargain for Institutional Power

If our new vision were to be implemented in its full scope, major shifts in power relationships among planning institutions would be perceived. We hope that our case for this approach is so compelling that the institutions affected will enthusiastically embrace it. Realistically, the approach would likely be resisted initially, in part because of organizational concerns about losses in power and freedom. In fact, however, such losses may be mitigated by compensatory gains in other areas. Some examples of this are:

- Military operations planners would, under our vision, lose some of their near-exclusive control of military planning, but the work of these planners might be far more influential in strategic and programmatic planning.
- CINC planners would lose some of their exclusivity over regional military planning, and be subject to more scrutiny by "outsiders," including the Joint Staff and civilian leadership. But at

the same time, the CINCs would gain more influence on global, programmatic, and strategic planning.

- Programmatic planners would lose some of their currently near-exclusive purview over framing and evaluating programmatic options, but they would gain by having an independent and more compelling evidentiary base for supporting their programs provided by the exercises of and with the operations planners.
- Strategic planners would take on more burdens in linking their plans to operations and programmatic planning, and would subject their strategic plans to a new scrutiny of operational testing. But in return, strategic planning would gain in influence that would channel programmatic and operations planning in directions more consistent with their strategies.

Thus, beyond substantive merit, there may be the basis for a grand bargain among the planners.

Prudent Access to Military Planning

An important premise of the proposed revisions to the defense planning process is increased communication and information exchange among strategic, program and operations planners. Many planners in the first two categories are civilians, while the third is almost exclusively military. Thus the revisions would necessitate adjustments in the current practice of severely restricting civilian access. We believe, however, that this could be accomplished without unduly sacrificing security. A more careful review of that issue would be appropriate, because there are substantial concerns. We believe that the problem will be lessened in the context of almost continual training and exercises against a vast range of scenarios.

The Necessity of Working the Hard Problem

In recent history, crisis planning and the forces to implement were never put to a test where they failed miserably. In the Cold War, while there were skirmishes, the big wars—Europe or an intercontinental nuclear exchange—never happened. In most of the recent, successful conventional operations—notably, Panama and the Per-

sian Gulf—crisis planning of the current ad hoc variety was not put to a stressful test. Plans from deliberate planning were substantially modified to meet the circumstances. But in all cases, there were weeks or months to make adjustments before forces directly engaged in combat.[5]

The key question for the future is: Given what adversaries have learned about the leverage on the U.S. of gaining strategic surprise and creating uncertainty, can we assume the present planning system will operate effectively in the future? It would seem that, without routinely training and testing the crisis-planning process in the context of the very uncertain environment we will face, that we could not prudently make this assumption.[6] From this it would seem very important to work the hard problem, whether by the means and concepts described in this report or other approaches. A good way to encourage consensus on this would be to emphasize, at all opportunities, how much trouble we would have been in had Saddam Hussein continued directly into Saudi Arabia, and to note that future adversaries will have learned lessons from the Gulf War.

INITIAL STEPS FOR IMPLEMENTATION

Assuming that root causes of resistance to changes in defense planning can be overcome, then implementation of the crisis-oriented planning system here proposed would require a number of steps.

The First Step

First among these might be to test the present system. Some may question whether the problems we describe in this report are as serious as they appear to be, and it would therefore be reasonable to

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[5]In the case of the Gulf War, there were six months of time available to adjust deployments and prepare employment plans. According to Bob Woodward's commentary in his 1991 book *The Commanders* (Simon and Schuster, New York, pp. 124–180), the operational plans for the operation went through a thorough vetting and revision over a two-month period.

[6]Even with a rigorous exercise program, of course, we would not expect to uncover all issues.

collect some empirical data. It is *possible* that the current system could respond more rapidly and effectively than we believe. Thus a straightforward, albeit perhaps painful, way to test the premise is to conduct some experiments. These would involve a limited series of crisis-planning exercises under the same conditions posed for testing the new system, including:

- No-notice warning of the crisis.
- Short response times to produce executable plans.
- Responsive to a range of political-military objectives and constraints.
- Crises defined as points in scenario space different from those used in the standard scenarios of deliberate planning, and distinctly troublesome.

Results of these experiments will likely show that either (a) the present system works quite well, (b) the present system is not effectively responsive, but there are clear, identifiable remedies that can be implemented confidently under its current structure, or (c) the present system is not effective and requires restructuring to fix it.

If outcome (a) or (b) occurs, then the present system should be retained with appropriate remedies as needed. There would be no sense in going through revolutionary organizational change without evident return. If (c) is the outcome, then there is a strong empirical basis to motivate change. Indeed, this might be compelling enough to mitigate some resistance to change.

The Second Step

Under the assumption that (c) is the outcome of the first step—that the present system requires fundamental restructuring—then some proof-of-principle testing may be prudent before full implementation of the new process proposed here. This proposal includes many new processes, guidance and reporting documents, personnel management practices, and evaluation tools. They are set out here with little depth of detail or experience.

In addition, we must have a functioning operations planning system continuously in place. We cannot shut one system down and hope no crises occur for a year while we build and shake down a new one.

It therefore might be wise to try them out in a prototype program to run in parallel with the current system for perhaps one two-year planning cycle. From this testing, much would likely be learned to refine and improve the new process before setting it in concrete through directives and permanent organizational change. Further, such a parallel approach would afford continuity in the planning process, avoiding the likely chaos that would result if the new process were put in place at once.

Follow-On Steps

Assuming that the crisis-oriented planning process passes the tests of these two initial steps, there are many specific actions that would be needed to put this approach in practice. These include:

NSC/NSC Staff:

- Formulate and coordinate the requisite interagency studies and executive implementing directives.
- Draft and seek support for any legislative initiatives necessary for implementation (e.g., changes to reserve component call-up authority).
- Provide strategic policy guidance from a national perspective to the planning system.
- Actively participate in exercises to test operations planning.

Secretary of Defense/OSD:

- Conduct a full-scale review of the Planning, Programming, and Budgeting System (PPBS) to determine what changes should be made to make it highly responsive to the objectives of the new crisis-oriented planning approach. This would include changes in standard measures of effectiveness used in reviewing defense-program options, education of OSD officials with respect to the

kinds of challenges faced by operations planners, and de-emphasis of the traditional defense planning guidance scenario(s).

- Formulate implementing directives from a DoD perspective.
- Direct appropriate high-level participation in crisis-planning exercises and oversee the exercises testing U.S. capabilities.
- Assure that the operations-planning system is able to produce executable plans with options appropriate for presentation to the President.
- Ensure that the responsibilities and authority of strategic, programmatic, and operations planners within DoD are clearly defined, and that communication among these planners is working effectively.

The CJCS/Joint Staff:

- Develop a sizable permanent staff of war planners to work routinely with CINC staffs in honing the skills and processes necessary to produce quickly, in crisis, appropriate and executable plans.
- Institute a vigorous program of not-for-grading command-post exercises to assure that Joint Staff and CINC staff personnel develop the requisite skills and personal contacts for effectiveness in rapid planning. This program would include occasional test exercises that would be conducted with no notice, with only rudimentary prior knowledge of the crisis to be focused upon, and with realistically complex changes of political-military ground rules occurring in the course of the exercise. Follow-up studies should determine rigorously the degree to which plans developed in the exercises could, in fact, have been executed.
- Put into place the technology to facilitate close teamwork between the Joint Staff and CINC staffs.[7]

[7]This would include extensive model-supported videoconferencing—for staffs, not just for commanders. By the end of the decade it may be possible to have videoconferencing be routine at the level of officer-to-officer communications from personal computers and workstations.

- Develop a new set of highly interactive and user-friendly computer models, data bases, and interfaces needed for effective building-block planning.[8]
- Become an active early user of both distributed interactive simulation (DIS) and associated wargaming on the one hand, and highly interactive analytic wargaming models on the other.
- Support vigorous efforts to develop improved decision-support systems able to assist commanders attempting to deal seriously with uncertainty.
- Develop a much more extensive set of information requirements to assist rapid adaptive planning. (These should, as a matter of priority, include defining a wide variety of standard support packages for ground, air, and naval units. For example, different "initial support increments" should be defined for different circumstances of terrain, potential opposition, mission, and time criticality.)

The War Colleges:

- Revise curricula not only to introduce the basic concepts of adaptive planning, but also to provide officers with personalized computer tools to experiment with adaptive planning. (This should emphasize microcomputer wargames with intelligent opponents and allies, and with random factors affecting both decisions and operations.)
- Devote more curriculum attention, even at the expense of other elements of the curriculum, to realistic assessment of opponent capabilities and opponent reasoning, with an eye toward refining officer capability to understand tradeoffs between the virtues of timely actions for deterrence and delayed actions with more substantial forces, and strategies that are more and less likely to have

[8]The DART system is a better image of what is needed than the JOPES system, although comparing the two is something of an apples and oranges affair. The JOPES system developed from a data-processing paradigm and was heavily constrained by preexisting methods, hardware, and mind-set. As it existed in 1991 and early 1992, it represented obsolete, inappropriate technology.

the desired effects on opponent reasoning (recognizing that the opponent's line of reasoning may be one or a composite of several).

Appendix A

CLASSIC DEFENSE PLANNING UNDER UNCERTAINTY, 1961–1990

PLANNING UNDER UNCERTAINTY IN THE KENNEDY-McNAMARA ERA

Initial Methods

Concern about uncertainty can be traced back at least to 1961, when defense secretary Robert McNamara initiated a large study of U.S. needs for general-purpose forces. The study concluded that there were sixteen different theaters in which the U.S. had military commitments and in which conflicts might occur. U.S. forces might be needed in eleven of these theaters. Even then it was recognized that war with the Soviet Union in Central Europe (much less general nuclear war) was not very likely, even though deterring such a war remained exceedingly important, and that by contrast any number of other contingencies might arise worldwide. From this arose the concept of rationalizing force *structure* in terms of the most stressing threats (the Soviet Union and China), but training and equipping the forces for flexibility. McNamara's approach anticipated a large strategic reserve in the United States with the necessary airlift and sealift to deploy them to where they might be needed. The forces would fight under a special contingency-oriented command. Even maritime prepositioning appeared in the plans of that era under the name of fast deployment logistics ships (FDLs).[1] None were procured, however, because of congressional opposition based in part

[1] Few of the details have been published in the unclassified literature, but the principal ideas are discussed in Kaufmann (1982, p. 4ff), Enthoven and Smith (1971, p. 210ff), and McNamara (1968, pp. 78–79).

on concern about the U.S. becoming embroiled in unnecessary conflicts.

Illustrative SecDef Guidance to the Military Departments

We discuss the Defense Planning Guidance (DPG) at numerous points in the text, but the DPG is a classified document of which there are relatively few unclassified descriptions. For the purpose of illustrating the *kinds* of information these documents contain, we quote here from Kaufmann (1982, p. 5ff). Given Kaufmann's participation in defense planning in this period, his overall depiction of guidance content can be assumed to be representative:

> In 1962, at Secretary McNamara's request, the military planners undertook a study of the need for conventional ground and tactical air forces.... They determined that about sixteen separate theaters of conflict could develop, ranging around the periphery of the Soviet Union and China from Norway to Japan.... They concluded that American... forces... would have to be provided in eleven of the theaters...
>
> Thus were articulated the main elements of what has come to be known somewhat inaccurately as the "two-and-a-half-war" concept. The unclassified references to it have been sketchy, but the planners of the time would probably not have been astonished to receive policy guidance such as this about the design of the conventional forces:
>
> 1. Assume that no more than two major nonnuclear contingencies and one lesser contingency will arise simultaneously.
>
> 2. Use the most demanding contingencies—in Europe, Korea, and Cuba—as the basis for developing the U.S. conventional force posture, but do not plan on committing the resulting forces only to those theaters.
>
> 3. In planning the U.S. posture, take allied contributions as given, though always encouraging the allies to do more, and assume that U.S. forces will make up any deficit between the attacker and the defender.
>
> 4. For political as well as military reasons, plan where appropriate on the basis of a forward defense. Trading space for time is inefficient because the war would be lengthened and larger forces

would be required to recover any territory lost during the early stages of a conflict.

5. Design the forces to cope with the initial and largely defensive stages of the war (from three to six months, depending on the theater), the assumption being that mobilization will provide the larger forces needed for later and more decisive operations.

6. Because of the uncertainty about the duration of potential conflicts, plan war reserve stocks on the principles of D-to-P (D-day to Production-day). That is, stockpile enough combat consumables (excluding ships and aircraft) to maintain intense operations until production rates are adequate to supply combat needs—a period of about six months.

7. On the assumption that the 1962 study was correct in its estimate of the threats and allied contributions, and hence that total U.S. ground and tactical air requirements will amount to twenty-eight and one-third divisions and forty-one fighter-attack wings, depend on the National Guard and Reserve forces for nine of the divisions (eight Army and one Marine Corps) and twelve of the fighter-attack wings (eleven Air Force and one Marine Corps).

8. In organizing this high-priority reserve force, require designated divisions and wings to be ready for overseas deployment from two to four weeks after a presidential call-up.

9. Design the forces so that they will be versatile enough in equipment, training, and supplies to operate in more than one theater and against more than one type of opponent. At the same time, keep them ready for rapid deployments.

10. Although the forces can be stretched to failure if more than three contingencies occur simultaneously or if attacks on them are heavier than anticipated, the lower-priority reserves constitute a hedge against these unlikely events. To preserve that hedge, plan on calling up the reserves in the event of an emergency.

To make the flexible response concept work... the forces themselves would have to become highly versatile.... Accordingly, planning guidance on deployment and strategic mobility might have read something like this:

1. Because of the sizable Warsaw Pact forces deployed in... and the possibility of surprise attacks,... for the time being leave the five U.S. divisions in Germany and...

2. In Korea, because of the heavy fortifications... and the strength of South Korean ground forces, withdraw the remaining two U.S. divisions and...

3. Expand the uncommitted strategic reserve in the continental United States to approximately nine active-duty and nine high-priority reserve divisions...

4. In designing this rapid deployment capability, assume that the United States and its allies will obtain thirty days' warning of enemy buildups, but owing to ambiguities in the signals and political hesitations about responding, will have only twenty-three days for their own mobilization and deployment.

5. Pre-position three sets of division equipment in Germany to which the NATO-committed divisions can be flown by Civil Reserve Air Fleet. Otherwise, plan on a mix of fast deployment logistic ships stationed in key waters overseas and in home ports with divisional equipment and supplies on board, and wide-bodied aircraft capable of lifting both units and their equipment to threatened overseas theaters.

EXTENSION OF BASIC CONCEPTS IN THE NIXON AND FORD ADMINISTRATIONS

In the Nixon and Ford administrations further progress was made in defining the "algorithm" for force sizing. Planning under uncertainty was always a theme (see, e.g., Schlesinger (1974), p. 83), and Secretary Schlesinger even used multiple planning scenarios in his guidance to the Military Departments, in a manner not unlike that of the current era, and he noted the need, once forces were sized against the illustrative scenarios, to test them against various "off-design" scenarios. A representative expression of this period's thinking is as follows (Rumsfeld, 1976, p. 114ff):

The Strategic Concept

The general purpose forces are appropriately named. They must be trained, equipped, and supplied so that they can deploy and fight in a wide variety of environments against a range of possible foes. While it is understandable that some areas of the world should be regarded as unimportant from the standpoint of traditional U.S. interests, we still maintain defense commitments... in Latin

> America, North America, Europe, the Middle East, the Persian Gulf, and Asia. There is always the possibility, moreover, that just as Great Britain and France regarded Polish freedom and territorial integrity as the final test of German intentions in 1939, we ourselves will decide to draw a line in some distant place where expansion must be halted.
>
> For these reasons, we must plan and prepare . . . in the face of large uncertainties as to where, when, and how they might be used. It should be emphasized, however, that operational and contingency planning differ in significant ways from force planning. Operational and contingency planning deal with the use of forces that are already in hand or being programmed; force planning attempts to determine the size and composition of our forces despite all the uncertainties about their use.

PLANNING FOR PERSIAN GULF CONTINGENCIES IN THE CARTER ADMINISTRATION

In the Carter administration there was even more emphasis on uncertainty, starting with an NSC request for a DoD study on Persian Gulf contingencies. Such a study was produced in 1979 (Office of the Secretary of Defense, 1979a) and dealt even more with regional threats and instabilities (e.g., on the potential for an Iran-Iraq war and on the potential for a future threat to Kuwait by Iraq) than with the Soviet threat. From this study, and the general political climate favoring defense initiatives, emerged the first programs (e.g., maritime prepositioning) that were later to form the basis for the Rapid Deployment Joint Task Force and, later yet, CENTCOM.[2] To be sure, the emphasis of Southwest Asian planning shifted almost exclusively to the Soviet threat after the invasion of Afghanistan, but the point here is that the DoD had taken quite seriously other threats to our access to oil.[3] From Brown (1980, pp. 114–115):

> Beyond these demands on our non-nuclear posture, we must now more than ever allow for the dangers that are arising elsewhere and

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[2]See Davis (1982) for relevant defense-planning history. See Appendix D of Department of Defense (1992) for a chronology of events related to Southwest Asian planning over the years.

[3]Non-Soviet threats are discussed guardedly in Brown (1983, pp. 7, 157).

> that could place new demands on our capabilities, especially in the Middle East and the area of the Caribbean.
>
> . . .
>
> I would be misleading you if I pretended that, at present, we can define clearcut and plausible contingencies in these two regions on the basis of which we should plan and program additional non-nuclear capabilities.
>
> The Soviets have about 23 divisions . . . north of Iran and, now, in Afghanistan. But . . . it would be unwise to focus our planning on only one specific threat—especially a Soviet threat to countries with which our relations are at present so fluid. One of the few confident predictions we can make about the region is that it will probably continue to be a highly unstable region, and that the course of events will thus be unpredictable . . .
>
> It is important to note, nonetheless, that there exists a large, and almost certainly continuing, military imbalance in the region. The weaker states . . . also happen to include most of the largest oil producers. . . . The strongest local military power is Iraq . . .
>
> In the Caribbean region, Cuba—with Soviet encouragement and support—could conceivably go beyond subversion and military assistance of local radical forces.

RENEWED FOCUS ON THE SOVIET THREAT IN THE REAGAN ADMINISTRATION

Under Secretary of Defense Weinberger, the DoD shifted to a more exclusive focus on the Soviet Union and possible proxy forces. It raised the potential of war with the Soviet Union on several fronts, either because of Soviet aggression on multiple fronts or because the U.S. would open new fronts as part of the overall warfighting strategy (Weinberger, 1981, pp. I-15–16). Weinberger also criticized the mechanistic nature of reasoning in terms of one or one-and-a-half wars, and even noted that if war began the U.S. would contemplate counteroffensives in places of our choice. Weinberger also emphasized the need to prepare responses under ambiguous warning. By and large, then, the Weinberger Pentagon was very much concerned about uncertainties and nonstereotypical conflicts. On the other hand, it gave only minimal mention to non-Soviet contingencies—

none in the front sections of the Defense Report, and only indirect mention in the rear (Weinberger, 1981, p. III-101):

> Our defense programs for Southwest Asia must offer capabilities across a spectrum of potential conflicts, including intraregional clashes and invasion by the Soviet Union.

Later in the Reagan administration, there was increased emphasis on flexibility.[4] For example (Weinberger, 1984, pp. 36–37):

> Our policy is defensive . . . We pursue this policy knowing fully that a defensive posture grants several military advantages to a potential aggressor. He can choose when, where, and how to attack. He can formulate a detailed plan for his operations to maximize his strengths and exploit our vulnerabilities. He can also mask his pre-attack mobilization efforts—under the guise of training exercises or diplomatic crises—so that we are faced with ambiguous advanced warning . . .
>
> We have sought to make our forces more flexible and mobile. Grenada reinforced a lesson . . . : we must not only structure our forces to cope with potential contingencies that we can foresee, but must also provide ourselves with the wherewithal to deal with the "unforeseen contingency."
>
> While we concentrate on developing forces that could deal with those contingencies most threatening to the United States . . . we cannot neglect . . . a wide range of lesser threats.

Similar guidance emerged from Secretary Carlucci as late as 1989.

CONSISTENCY OVER TIME AND POLITICS

Perhaps the most important conclusion from this quick review of defense planning is that secretaries of defense and OSD were consistently concerned about planning under uncertainty throughout the entire period. Furthermore, they made regional distinctions and, in most cases, concerned themselves with contingencies very different

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[4]Concern about matters such as ambiguous warning and flexibility was a consistent theme of Under Secretary of Defense for Policy Fred C. Iklé and, over twenty years, Director of Net Assessment Andrew Marshall.

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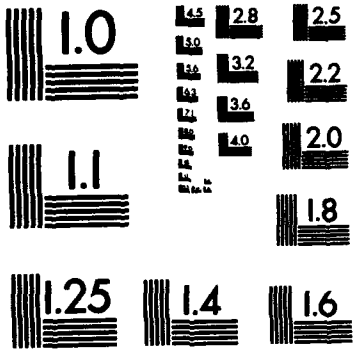

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

from the standard Soviet invasion of the Central Region. This said, the reality is that their concerns amounted in most cases to empty exhortations, with the military departments focusing their attention on the standard threat scenario(s) except when compelled to do otherwise. Some progress was made (e.g., in the 1980s, under U.S. pressure, NATO developed a set of premobilization readiness measures that could be implemented under ambiguous warning), but the tendency to converge on the "standard" case was generally the dominant reality.

Appendix B

ILLUSTRATIVE MULTISCENARIO ANALYSIS

During the mid-1980s, RAND conducted a major balance study for the Central Region in which we introduced and demonstrated multiscenario analysis as an antidote for more usual studies focused on standard defense planning scenarios. The study, by Paul K. Davis and Robert Howe, is not yet generally available, but the general principles are discussed in Davis (1988a). Table B.1 from that reference indicates the kinds of questions we were attempting to address and Table B.2 indicates qualitatively some of the many variables examined.

The most important aspect of this work may have been demonstrating that the sensitivity of expected war outcome to these many variables was high, not low. That is, war outcomes are truly sensitive to many variables, not merely the ones on which most planning focuses. Further, the sensitivity is not an artifact of the analysis, but part of the reality with which general officers have long had to deal.

Table B.1

Illustrative "What If?" Questions for Central Region Study (1986)

- What if one or more of the NATO allies reacted slowly in crisis, resulting in a ragged mobilization process and disrupting the general defense plan?
- What if Poland cooperated only minimally with the Soviet Union, or fought with less than high intensity?
- What if Pact forces proved somewhat less effective, for constant equipment, than nominally assumed?
- What if the intensity of war proved higher (or lower) than usually assumed? Would NATO fare better or worse, and how would this affect sustainability?
- What if deployment times proved much longer than usually assumed (*e.g., for U.S. POMCUS forces or low-readiness Soviet divisions*)?
- What would a Soviet simulation of conflict look like if it began by assuming a NATO invasion of the Pact? How would this affect the circumstances of battle and the nature of campaigns?

Table B.2

Dimensions of Multiscenario Analysis for Central Region Study (1986) (with illustrative variables)

Political-Military Scenario	Strategy and Tactics	Force Structure	Technical Factors
Number of theaters	Duration of Soviet mobilization	Size of threat to Central Region	Intensity of war (i.e., attrition rates)
Time between wars in different theaters	Soviet scheme of maneuver and deception	Extra divisions Fewer divisions	Densities at which breakthroughs occur
NATO mobilization times by theater	NATO defense strategy by circumstance	Arms-control reductions to both sides	Tacair effectiveness for killing and countermaneuver Helicopter effectiveness
Allied behaviors (both alliances)		Readiness levels	National fighting effectiveness
Premobilization preparations	Soviet use of other theater forces Use of air forces	Days of supply	Unit breakpoints by readiness level Value of support forces (e.g., repair and C3I)

Appendix C

APPLYING BUSINESS EXPERIENCE ON ORGANIZATIONAL LEARNING

CORPORATE EXPERIENCE IN ORGANIZATIONAL LEARNING[1]

Background

During the 1980s and 1990s a fierce competition developed between U.S. and foreign firms, especially those based in Japan. What were once stable American markets in such industries as automobiles, consumer electronics, and high-technology products were upset by new foreign actors who challenged us on our home ground as well as in international markets. It took over ten years for Ford and General Motors, as two notable examples, to recognize what was happening and undertake major restructuring programs—with the results still in doubt for General Motors. The competitive shocks to corporate America led to a major new interest in how organizations learn—i.e., how they adapt to changed circumstances. Certain key themes come out of these findings.

Individual Versus Organizational Learning

One key theme is a distinction between individual and organizational learning. Individual learning without organizational learning is common. Organizational learning occurs only after individual learning is

[1]This appendix summarizes work first presented by RAND consultant Paul Bracken of Yale University and Paul Davis in a series of briefings to J-5 staff between September 1990 and the fall of 1991. It draws heavily on draft material provided by Bracken in January 1992.

implemented by other parts of the organization and installed into its routines, norms, reporting systems, evaluation methods, and so forth.

Corporations learn when key individuals share their experiences and observations about their own model of how their organizations function; decide how changes in routines are likely to affect performance; implement the changes; and compare actual with expected results (Argyris and Schon, 1978). This means looking at evidence in new ways that do not necessarily use the organization's standard categories or technical vocabulary. In the jargon of organizational theory, uncertainty is not "absorbed" at the organization's perimeter and transformed into standard concepts and vocabulary, but is instead transmitted inside the organization in a way that impels it to reposition the way at it looks at the world.

One theme that emerges here is that sharing individual insights about how an organization works requires candid communication of those in the organization and those outside of it, extending to those who are not usually consulted in the organization's operation. For many years Ford Motor Company responded to the Japanese competitive onslaught by emphasizing quality in production. But this emphasis involved only internal memoranda; existing reporting channels were used and only Ford employees were called on to implement it. After several years, the results were disappointing. Only when an outside expert, Professor Edward Deming (the creator of Total Quality Management), was brought in, along with new communication channels to convey this information, was real change achieved. By the early 1990s, outside rating services concluded that Ford had significantly improved its quality control measured by number of defects per car.

The conclusion is that without some real change in the reporting channels, key concepts, or vocabulary, organizational learning does not take place.

The Role of Leadership

Strong leaders are necessary, but not sufficient. Having a leader who energizes the organization, who seems to be omnipresent and capable of making good decisions, and who has lots of ideas, means little

in terms of true corporate learning unless the changes cited above occur.

The commander may set the tone of an organization, but a commander *alone* will not have an enduring impact unless more fundamental changes occur in how an organization sees its outside environment. This is one of the reasons corporations tend not to change until a substantial shock occurs to profitability, market share, or stock price, *forcing* them to see things in new ways. The shock induces a wider search of options, concepts, and assumptions. To the extent that the existing vocabulary and concepts cannot handle or even describe this uncertainty, new concepts and vocabulary are invented to manage it. *The role of a leader, such as the corporation president, is not so much to tell people what to do as it is to facilitate and expedite this process.* There are several ways that this is done.

One way is for corporate leaders to highlight or even exaggerate the problem—i.e., to convince employees that things really are bad and cannot go on as they have. The art in this is to do it in a way that controls perceptions. If the situation is seen as hopeless, then the most valuable employees will search for jobs elsewhere, but if there are potential remedies, even if difficult to achieve, then these same people will be challenged and motivated.

A second leadership function is to create a corporate environment where it is acceptable, and even encouraged, for employees to search for new concepts and organizational vocabulary. At its most obvious, this means not punishing employees for deviant perceptions. The art here is to draw a line that encourages experimentation, searches for new organizational routines, and supports new reporting channels and communication circuits—without letting "nutty ideas" grow so fast as to produce a chaotic fragmentation of the organization. In the corporate restructuring of the 1980s there was not only a downsizing of the number of employees, but also a debureaucratization. The purpose was not just to get smaller, but to *decentralize* decisionmaking in order to bring more uncertainty *in* to the organization. By decentralizing, authority is given to those closer to the action. Oftentimes a corporate president will tolerate new ideas he disagrees with, simply for the purpose of demonstrating a commitment to tolerance, new thinking, and decentralization. This too is very much an art.

Finally, a corporate leader can facilitate learning by introducing outside ideas into the firm by bringing in consultants and outside perspectives, and by devising other ways as well to sensitize employees to subtleties in the world that were previously masked by the organization's vocabulary. This is often crucial in business because many executives tend to look at things in a narrow professional way (Mintzburg, 1981, pp. 103–116). For example, many business school graduates taught on the merits of decision trees will view almost any problems in these terms, no matter how inappropriate.

Rewarding Executives for Change

Most of the time, business executives are evaluated on their ability to make an organization conform to existing routines. American management in the 1980s took a long time to come to the realization that while this was an appropriate way to do business in the quiescent 1950s and 1960s, it was very risky in the 1980s as the environment became more competitive. For example, American managers used to beat down the prices of their suppliers and subcontractors as a way to achieve cost savings. In the U.S., it was considered a good thing to drive your supplier to the brink of insolvency, because this indicated that every last penny was squeezed from his margins. Japanese firms, in contrast, try to modernize their suppliers and to have long-term relations with them, believing that such is the best way to maintain quality suppliers who will always be there when needed, and also that it is a good way to reduce inventories and carrying costs of components. Only recently, and with great anguish, have American executives changed their view of supplier relations. Organizational jargon in the sourcing business has changed from "minimize cost of inputs" to "maximize quality of inputs," and from "minimum standards" as the basis for evaluating suppliers to one of their "capital adequacy."[2]

[2]Capital adequacy of a subcontractor is used as a measure not only of his ability to stay in business, but also of how capable he is of technical modernization such as purchase of numerical machine tools, computer-aided design equipment, etc.

SPECIFIC EXAMPLES AND APPLICATIONS

Let us now give three brief case histories to illustrate these ideas and other steps that have been taken by organizations undergoing change.

Decentralization in Panasonic

Panasonic, the brand name for the Japanese Matsushita electronics firm, faced a major problem in its evolution to a world leadership role in consumer electronics. Its early successes in the 1960s originated from a Japanese base and exports to Western Europe and the United States. By the 1970s it had a problem. The main problem was that Japanese companies were extremely hierarchical, with important decisions kicked upstairs to headquarters. This worked well in Japan, but it did not work for Panasonic when it grew to multiple plants on several continents. It obviated the advantages of its offices in Europe and America. Their role was to link the speed of changes in consumer tastes with R&D and production decisions. In short, Panasonic's strategy was to beat other consumer-products firms to market, thus dominating the field in VCRs, televisions, stereos, etc. To be close to markets in the 1970s, Panasonic had to build a larger presence in overseas locations.

To break up a hierarchy of rigid reporting channels, and to encourage risk taking among otherwise risk-averse executives, Panasonic held annual weeklong corporate trade fairs (see Bartlett and Ghoshal, 1989). Each global division (Western Europe, U.S., Southeast Asia) sent its employees to this event, where they also mounted booths that displayed their latest products. A European R&D branch would thus expose its product ideas to executives from other global divisions.

These corporate trade fairs may strike some as a gimmick, but they accomplished a number of important things in line with the corporate learning model described earlier. Employees, by (literally) wandering around the floor of the fair could, without approval from their superiors, open up new communication links with others in Panasonic. New ideas, approaches, and vocabulary were free to

develop without any potentially stifling reviews. In addition, it gave those lower in the hierarchy a stake in program success. Pansasonic had long recognized that its top managers would pay lip service to innovation, but in fact would not adequately encourage their employees to actually develop in this direction. Such barriers were an especially large problem because of the great pressure against deviance existing in Japanese firms.

Revitalization of Philips

A second example is from Philips, the Dutch electronics company. The Philips problem was that it rode to success in the postwar economic boom as the Netherlands developed a highly protected welfare state. The Dutch state, and others in Western Europe, pursued policies that insulated its population from outside shocks and pressure. Medical care was guaranteed. Family policies helped to support child care. Most importantly, it became extremely difficult to terminate employees for whatever reason, even if markets were lost. Unemployment compensation and state-regulated job security provided a high financial and political penalty to downsizing. In addition, the collection of state welfare policies fostered a national culture of group, rather than individual, responsibility. This may be fine for a country, but inside a corporation it meant that individual initiative was not encouraged. Group responsibility prevented singling out different divisions for restructuring because "everyone" in the company was responsible for the conditions at hand. Governmental policies translated into insulating the firm from the market, removing the main stimulus for innovation and productivity.

Philips pursued a two-track solution to this problem. First, it set out to shock its employees into accepting that their continuing loss of market share to Japanese firms, such as Panasonic, could not continue. Nor could government policies insulate the firm from these onslaughts. Second, it sought to change the power of the government, removing some of the excesses of its welfare state and job protection policies. The first track was pursued by communication to employees, not through corporate channels, but through planting stories in the national and local press about the threat from Japanese firms. Internal memoranda had long been ignored by middle managers, as they protected their internal fiefdoms, but greater credibil-

ity was attached to stories that did not apparently come from top managers. The second track was pursued by senior management's enthusiastic support of the European Community's 1992 program. The idea behind this was that the Netherlands had the highest welfare and strictest job protection laws in the EC. The EC '92 program would establish EC-wide standards, replacing national laws, and ultimately leveling out variations in them. In such a process the Netherlands would fall to a lower EC average, while Greece would rise. There was no way that the EC standard for job protection could be any stricter than the Dutch ones. Supporting the EC was politically acceptable, whereas attacking the Dutch government was not.

By no means has Philips transformed its organization. Many problems remain. But major layoffs have finally taken place, and a new management team has been brought in ahead of schedule, something that had never happened in Philips' history.

Absorbing New Ideas: General Motors and NUMMI

A final example describes how a company went to major lengths to introduce new routines into a hidebound and seemingly unchangeable bureaucracy. General Motors launched a joint venture with Toyota Motor Co. in 1983 called the New United Motor Manufacturing Company (NUMMI), locating an automobile production plant in Fremont, California.[3] GM's intent was to change a rigid bureaucratic structure where ideas not invented there were treated with great suspicion and resistance. Toyota work methods, organization, and reporting systems were adapted and used by GM workers at the plant. Instead of a hundred different job classifications, NUMMI had only four. A just-in-time inventory system was used, with close ties to suppliers. A pay-for-learning system was installed, to encourage workers to learn additional skills.

Top GM executives *individually* knew full well the inner workings of the Japanese motor giant. What they did not know was how all of these things could be translated into an American setting and undertaken all at once in a functioning plant. The NUMMI experiment

[3]This discussion draws on "General Motors' Asian Alliances," Harvard Business School Case 9-388-094, 1988, as well as research into this case by Paul Bracken.

crystalized the difference between individual and organizational learning. GM executives could not implement Japanese methods without radically transforming their own system, confronting the legacy of the past way of doing things. NUMMI was an expensive way to force such learning (and has now been terminated). In retrospect the NUMMI plant is seen to have functioned well. What it did not take sufficient account of was transferring the lessons learned from NUMMI to the rest of the GM empire, something that has proven slow and difficult. Since the NUMMI experience began, General Motors established the Saturn plant, which is drawing heavily on Japanese methods but includes much that is unique.

COMMON FEATURES OF THE EXAMPLES

In their different ways, these three examples illustrate ways to facilitate the organizational learning experience. Existing communication patterns were shaken up, bypassing the existing hierarchy (Panasonic). The need for change was emphasized to employees in credible ways (Philips). Attempts were made to change the perceptions of outside actors the firm dealt with (Philips and the Dutch government, GM and its suppliers). Investment in "organizational learning" was made (all three cases). Finally, in each case careful attention was ultimately given to *implementing* change. Change was not something that sprang from the minds of top leaders who simply informed their underlings of what was needed. Instead, new systems were viewed in terms of how best, and most quickly, to introduce them to all of the power bases that mattered, both within and outside the firm. The changes were not allowed to stand on their own merits, for the simple reason that existing categories, concepts, and vocabulary would almost surely filter out such change as irrelevant uncertainty that did not conform to existing organizational norms. Existing legacies had to be overcome, and this was different from merely thinking up new ways of doing things.

IMPLICATIONS FOR THE JOINT STAFF

Relevance of Corporate Experience to the Joint Staff

There are, of course, many differences between the Joint Staff and upper management in corporations seeking organizational change.

The latter have a much clearer set of bottom-line accounting measures (stock price, return on assets, profit, etc.). In addition, corporations receive feedback through a continuous involvement with their environment. The Joint Staff's major contributions tend to be revealed only in military operations, which are relatively rare events. Nonetheless, there are important parallels as both have experienced large-scale environmental change, are attempting to do things in new ways, and are to a great extent prisoners of their pasts.

One major insight from corporate experience is the need for an implementation program for *any* new planning system—a program that goes well beyond establishing top-level directives. Such a program would plan how to introduce the new way of doing business, with attention to some of the likely obstacles to be encountered. The Joint Staff has a number of advantages that can be exploited for this purpose:

- Military organizations understand, value, and follow doctrine. Top-down directives and new procedural documents (e.g., National Military Strategy, Joint Strategic Capabilities Plan, Defense Planning Guidance) will be significantly heeded.
- Educational infrastructure exists to facilitate change (e.g., the National Defense University and war colleges).
- The Joint Staff and commands have high turnover, and the new officers can be viewed as change agents, because they have not been thoroughly indoctrinated in the old ways.
- Since the Goldwater-Nichols Act, the Joint Staff has been attracting high-quality officers.
- Ultimately, the Joint Staff and CINCs have mostly similar objectives, despite organizational frictions.

Possible Techniques and Instruments of Change for Joint Staff Use

Table C.1 gives a checklist summary of things that need to be considered in an implementation program to change the planning system of the Joint Staff. It is drawn from suggestive corporate experience as applied to the likely obstacles confronting the Joint Staff. Many of

Table C.1

Issues in Implementation of New Joint Staff Planning System

Issue	Joint Staff Option
Inappropriate norms, vocabulary, and procedures	Rewrite doctrine and procedures to emphasize and introduce the vocabulary for rapid adaptive planning. Use vehicles of National Military Strategy, the Chairman's Net Assessment, the Defense Planning Guidance, the Contingency Planning Guidance, the Joint Strategic Capabilities Plan, the Chairman's Program Assessment, and other significant documents.
Educating and enlisting key figures (e.g., the CINCs)	Bring them in early to design of system (e.g., to defining decision support tools, exercise design, generic response options, types of desired flexibility).
Nominal high-level support and good formal response to guidance, but uncertain depth of change	Create "young turk" officer corps and pit them against each other without general officer supervision.
Potential undercutting of goals by higher-level management processes	Seek reform in the PPBS system to increase value seen in adaptiveness, flexibilty, and robustness of capabilities.
Increasing flexibility	Decentralization to CINCs where appropriate; holding wargame exercises to stimulate rapid adaptive planning; stress participants with realistic rapidly changing scenarios (rather than scripted play); introduce a competition for good ideas and methods (e.g., CINC equivalents of trade fairs).
Overcome past legacies	Focus on changing norms, not people; create incentives through promotion programs, career-enhancing "executive development" programs, etc.
Absence of a market to provide reality checks and appropriate feedback	Greatly increase emphasis on realistic training and exercises, including test exercises with stressful scenarios.

the options cited are obvious extensions of the corporate experience described earlier, and of the basic model of organizational learning.

OBSERVATIONS

Most of this appendix merely documents ideas expressed between late 1990 and early 1992. Let us observe here that the Joint Staff has already been remarkably successful in many aspects of its implementation program. In particular, major strides have been made in changing norms, procedures, and vocabulary. Adaptive planning appears to be becoming a reality. Further, the experiences of Desert Shield and Desert Storm have been a tremendous stimulus for appropriate change. Nonetheless, we note that many of the implementation ideas of Table C.1 remain relevant today (January 1993). We have attempted to reflect all of them in the text. The three that seem to us most worth mentioning here are: (a) the emphasis on exercises (to compensate for the lack of a market), (b) creating incentives for competition among planners and the purveyors of planning tools (e.g., "trade fairs" at CINC conferences), and (c) reforming PPBS and other national processes to better integrate them with the concepts of rapid adaptive planning that have been introduced by the Joint Staff.

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